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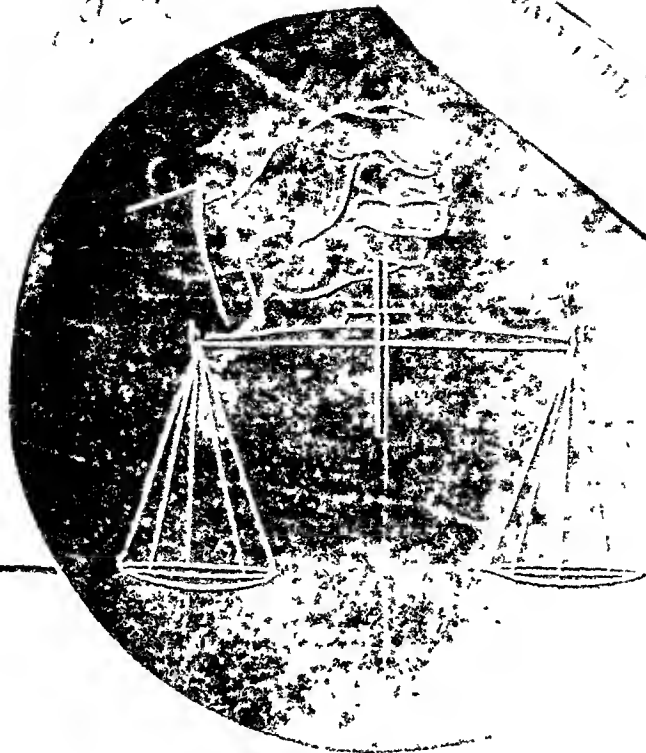
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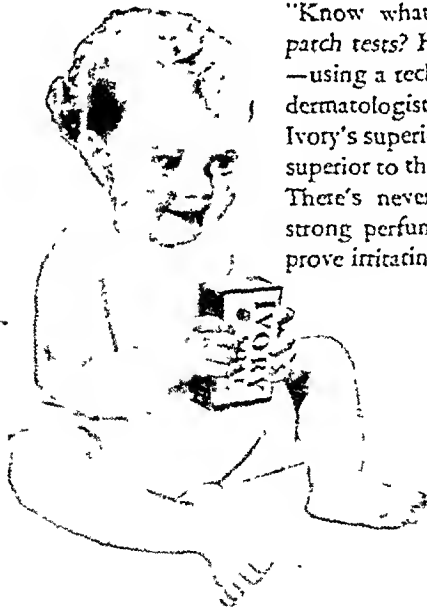
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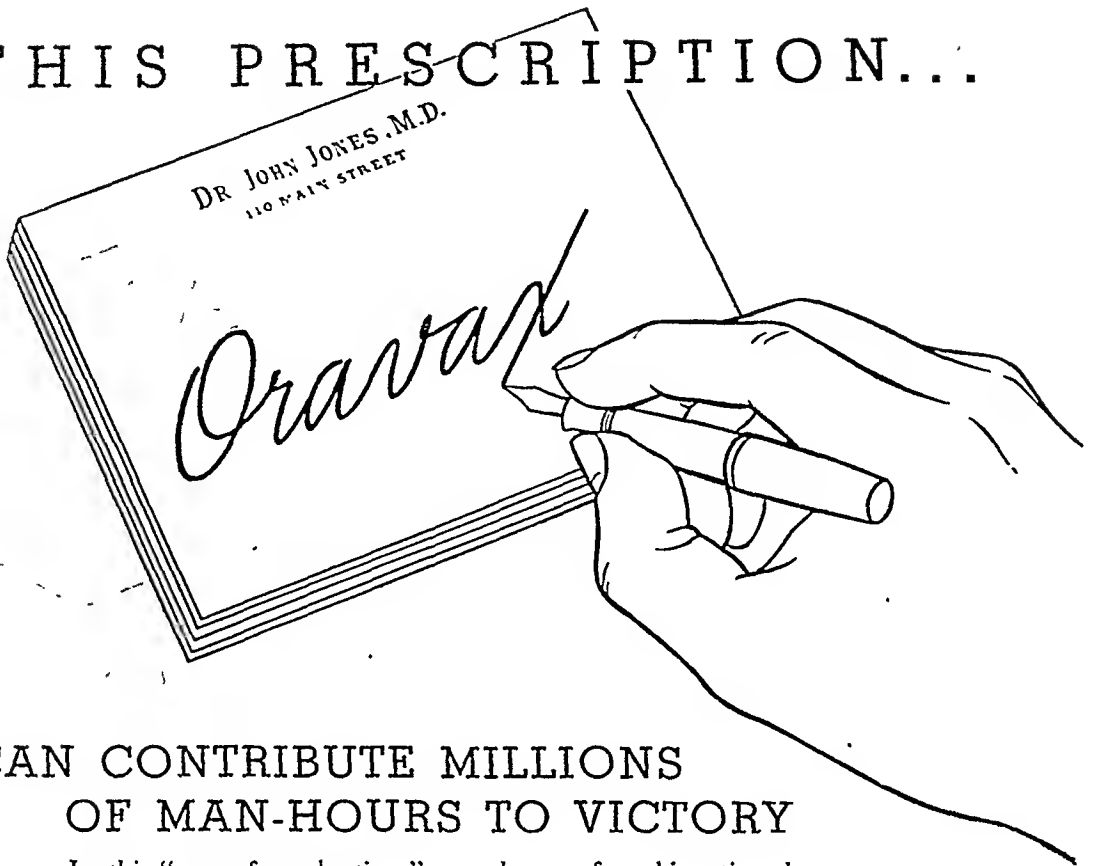
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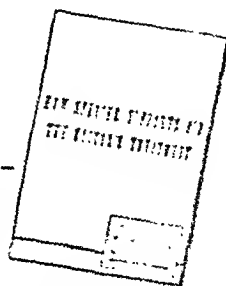


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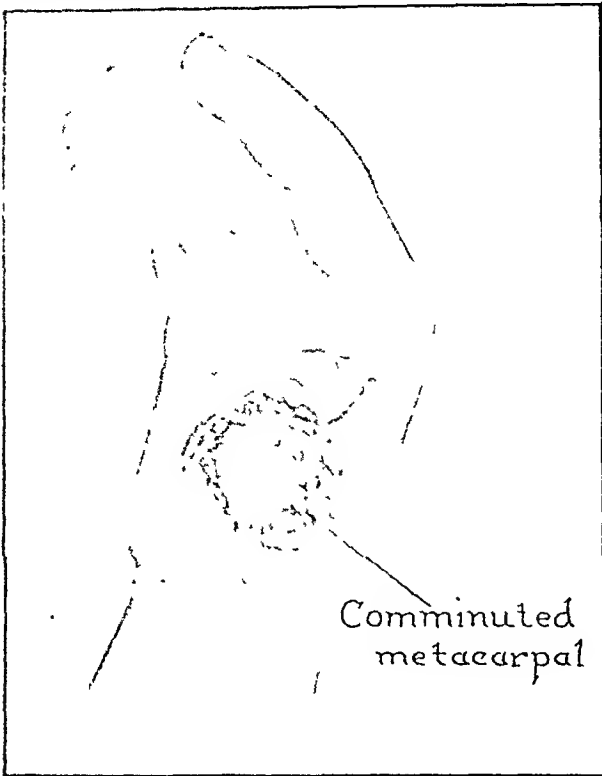
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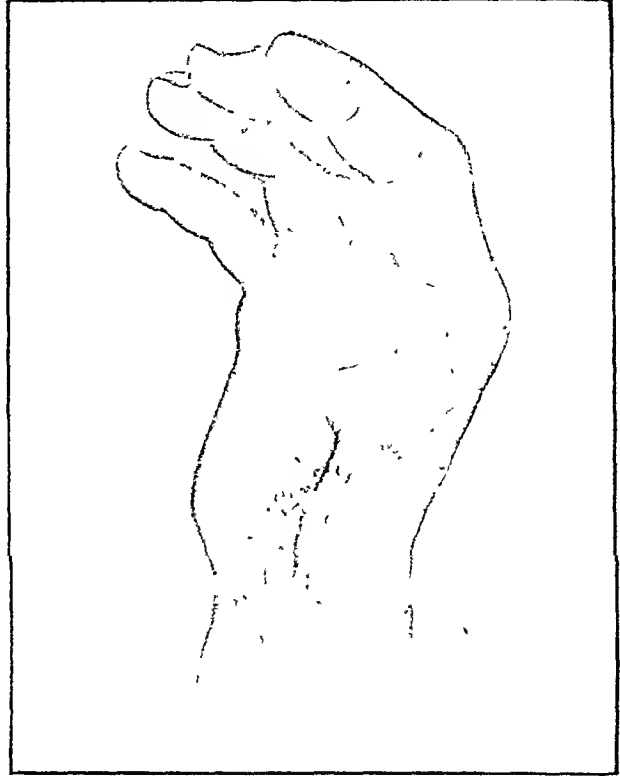
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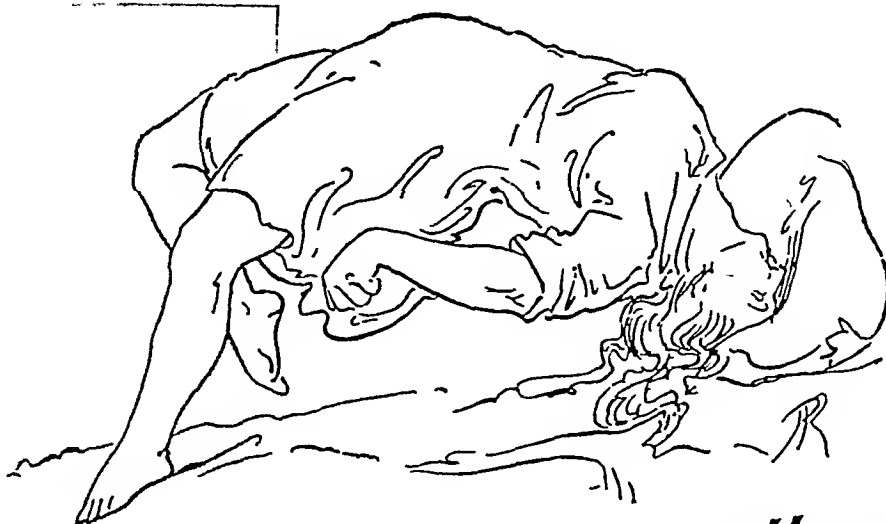
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1. McEachern, D.: *Canadian Med. Ass'n J.*, 45:106, 1941.
2. Lennax, W. G.: *Med. Ann. Dist. Cal.*, 10:461, 1941.

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A SUPERIOR COLLOIDAL OF MINERAL OIL EMU

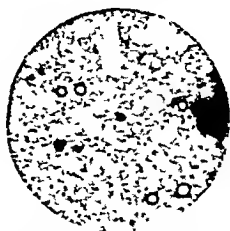
PRESENT day treatment of chronic constipation differs greatly from methods used a few years ago. Whereas in the past, evacuation has been forced, causing irritation, modern physicians now use measures to promote natural emptying of the colon by softening the fecal mass.

Kondremul "Tissot", due to its smoothness of action, has led the way in this new method of bowel regulation. Following several years study of emulsification processes, our colloidal research chemists found that when Irish Moss was used as an emulsifying agent for mineral oil, a creamy emulsion of microscopic fineness was made possible.

By employing this special process, we have developed in Kondremul, a perfect emulsion with increased ability to resist enzymic and thermal action within the bowels.

Kondremul pours easily from the bottle, mixes well with water or milk, and is pleasantly flavoured, making it easy to take.

THE MICROSCOPE REVEALS WHY KONDREMUL IS SUPERIOR



Human feces after ingestion of Kondremul. The oil is intimately mixed with the mass.



Human feces after ingestion of mineral oil. Note the large patches of free oil.



Human feces mixed in vitro with Kondremul. The mixture is almost identical with that of (1), thereby indicating no appreciable amount of breakdown in the emulsion.

TYPES OF "KO"



Depending on the type of action desired, a wide range of usefulness in the three types of

KONDREMUL with B₁
— a palatable emulsion containing 55% mineral (chondrus crispus) is used as an emulsifying agent. It contains 200 International units of Vitamin B₁ per ounce. It is inert—may be used as a regulative in children.

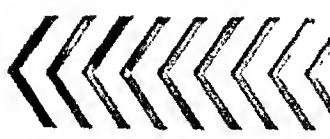
KONDREMUL with Non-Bitter Extract
— combines the tonic laxative action of non-bitter with the soft bulk of Kondremul.

KONDREMUL with PHENOL
— laxative and regulative. Contains 2.2 grains of phenol per tablespoonful of Kondremul.

DOSAGE: ADULTS—one tablespoonful morning. Gradually decrease if on improvement.
CHILDREN—one or two teaspoonfuls daily as needed.



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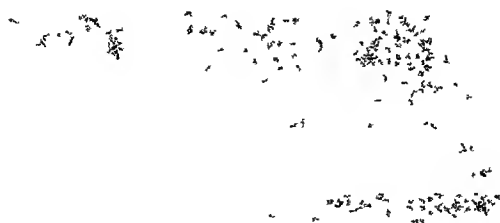
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MONTREAL



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DOSAGE:—One to two teaspoonfuls.

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An agreeable liquid preparation, free from opiates, combining sedative, antispasmodic and expectorant properties. An exceedingly palatable preparation of pleasant aroma and flavour. Reduces frequency and severity of paroxysms in whooping cough.

DOSAGE:—(1 to 2 years) $\frac{1}{2}$ to 1 teaspoonful every 4 hours
(2 to 4 years) 1 to 2 teaspoonfuls every 4 hours
Older and younger children in proportion



Charles E. Frosst & Co. MONTREAL, CANADA

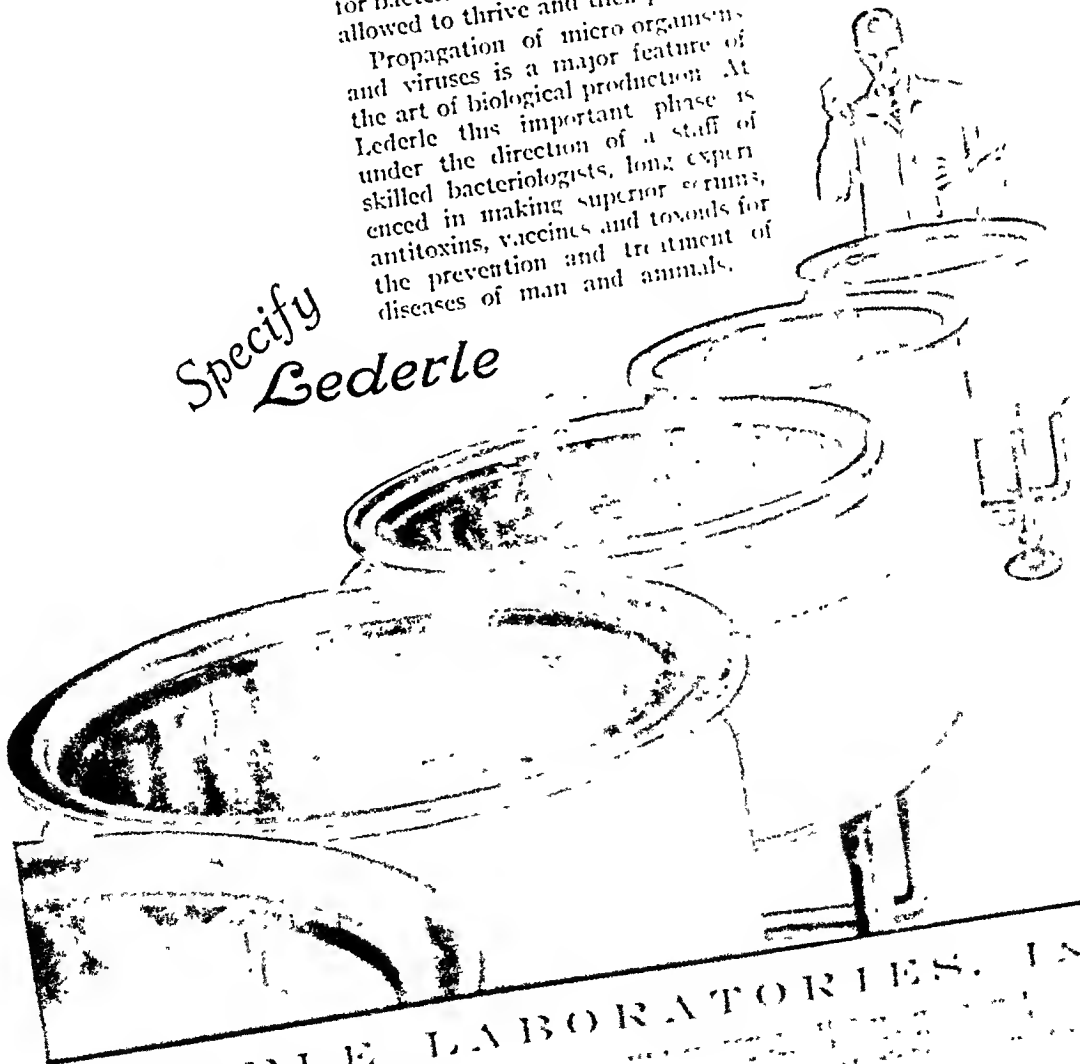
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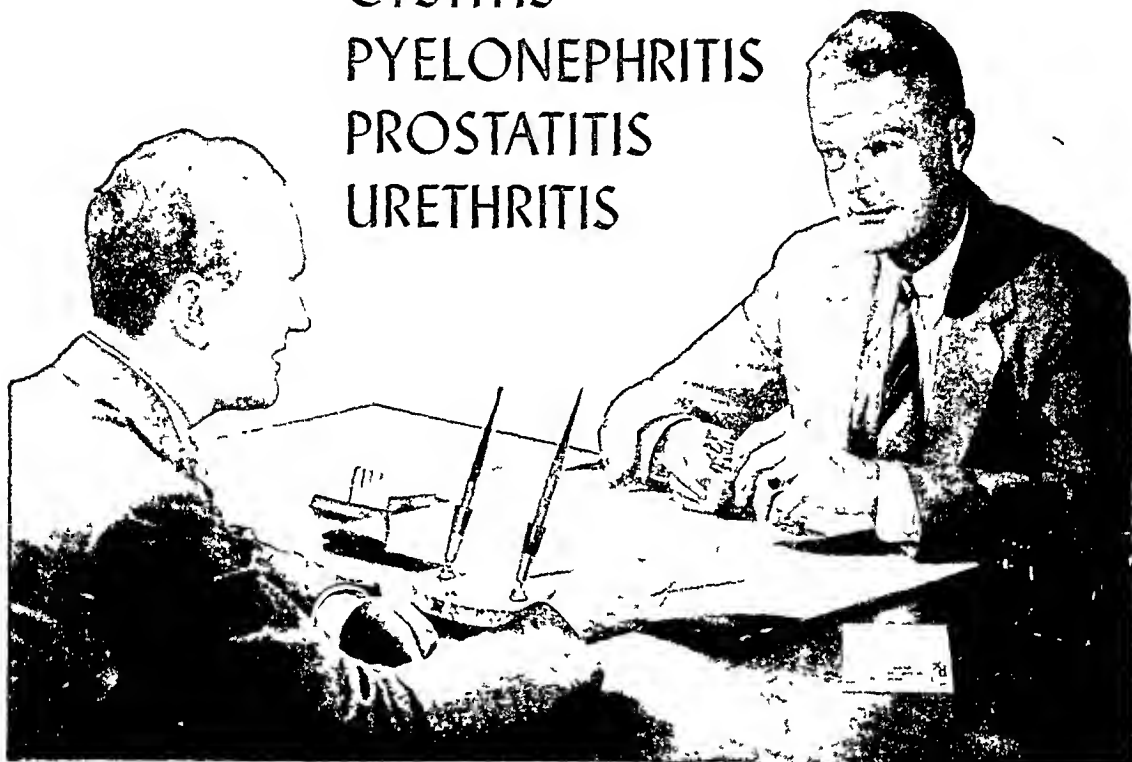


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Conveniently administered perorally in the average dosage of 2 tablets *t.i.d.*, Pyridium possesses a combination of advantages. It is relatively nontoxic, is effective in the presence of either acid or alkaline urine, is well tolerated, and has a local analgesic effect on the urogenital mucosa.

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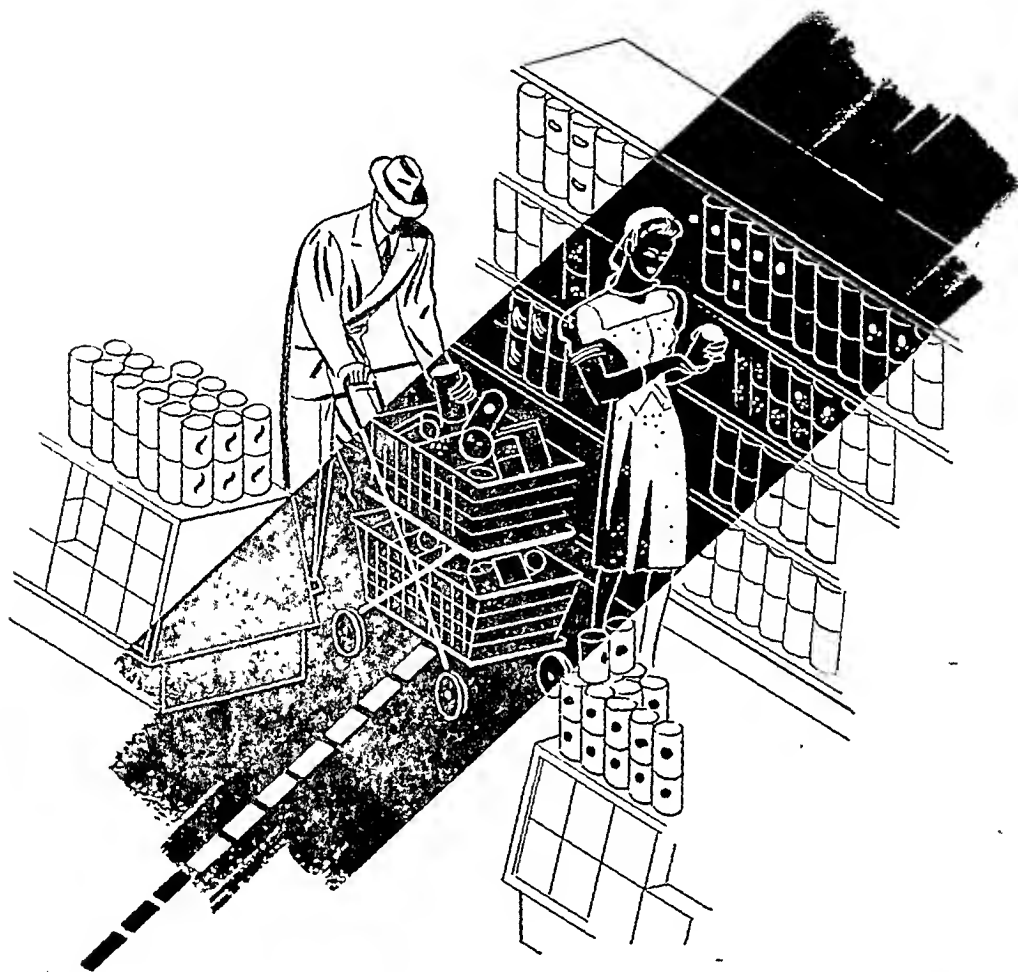
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The Canadian Medical Association Journal

Vol. 47

TORONTO, OCTOBER, 1942

No. 4

OSLER'S INFLUENCE IN THE WAR AGAINST TUBERCULOSIS*

By CHARLES D. PARFITT, M.D.

Toronto

THE four periods of Sir William Osler's professional life have been comprehensively described in the previous Memorial Addresses, given by either a contemporary, a literary friend, a successor or a colleague, each peculiarly qualified by knowledge both of the subject and of the setting of the period. Your Committee now desires that a particular interest should be developed as the subject of this address,—an outstanding activity to which Sir William gave much time and effort, one in which he accomplished much, namely, the fight against tuberculosis. The honour of doing this has come to me because I had the privilege of working for Dr. Osler when, at the height of his career, his interest in tuberculosis was about to change from an academic one to an ardent propaganda for public health. For the purpose of this address, the story of Osler's life-long study of tuberculosis and of his effective influence in furthering public health measures in fighting it will be isolated in so far as possible from his other varied and inessential activities. But his interests in this field alone were so many that they must often be summarily dealt with.

So much has been written about Osler that it is safe to assume that the main facts of his career are generally known. Dr. Harvey Cushing in his memorable "Life of Sir William Osler" has given the world a biography that will be the author's lasting glory. This treasury of incident and personal relations provides information not to be found elsewhere, and I have freely drawn upon it. The "Chronological Bibliography" of Osler's publications, by Miss M. W. Blogg, and the "Classified Biblio-

graphy", edited by Dr. Maude E. Abbott, based on this work, are invaluable guides to the Oslerian student. They simplify for him the collection of papers on special subjects from upwards of twelve hundred articles from Osler's pen, and permit him to dispense with many references.

MONTREAL

The first intimation that young Osler knew of tuberculosis as a scientific problem was at the time of his transition between Toronto and Montreal. A letter from Dr. James Bovell, who had gone to the West Indies in the summer of 1870, told that he was trying to confirm some of Villemin's findings by the inoculation of guinea-pigs with tubercle. It is evident that this subject had been a matter of discussion between them.

As a senior student Osler spent the greater part of the summer of 1871 in Montreal, and it was then that he came into such intimate contact with Professor Palmer Howard that a lasting, almost filial, relationship developed, so that as mentor Howard replaced Bovell. That summer the problem of tuberculosis was under discussion, stirred up by the epoch-making work of Villemin and the radical views of Niemeyer, an exponent of the dualistic theory of the origin of phthisis. Osler wrote a generation later, "Every lung lesion at the Montreal General Hospital had to be shown to him (Howard), and I got my first-hand introduction to Laennec, to Graves and to Stokes, and became familiar with their works." Both Bovell and Howard had been students at Dublin when Graves and Stokes flourished.

Two years later, while Osler was in London, controversy was still acute regarding the speci-

* The Fifth Osler Oration, delivered at the Seventy-third Annual Meeting of the Canadian Medical Association, Jasper Park, Alberta, June 17, 1942.

ficiency of tuberculosis, and at the time of his return to Montreal in 1874, as Lecturer on the Institutes of Medicine at McGill (about midway in point of time between Villemin and Koch), opinion in Montreal about tuberculosis was a very vexed question. Professor Howard's address in medicine at the meeting of this Association in 1874, the subject being "Objections to Some Recent Views upon the Pathology of Tubercle and Pulmonary Consumption", shows well the confused thought prevailing on the subject at that time.

Osler's prodigious energy made him seek work during this busy first year that others were glad to yield to him. He did most of the autopsies, and early in 1875 volunteered to take the service of the smallpox ward. From this service came the autopsy which led to his classic paper "The Pathology of Miner's Lung", his first publication relating to the lungs, which reviewed what was known of the subject since Pearson described the first recognized case in 1813. Osler made an original observation, giving positive evidence as to the external origin of the pigment—the result of his early-acquired microscopical knowledge under the direction of his revered school-teacher, the Rev. W. A. Johnson.¹ He also described some experiments he had made on the phagocytosis of granules.

With the honorarium received for this year's extra hospital service Osler bought good microscopes to equip the laboratory for his special practical course in clinical microscopy, the first to be offered in this country. In the "Introductory Remarks" to this course he said of the essential microscope, "Satisfactory evidence can be obtained by it of the occurrences of softening in a lung, by a careful examination of the sputa, even before the physical signs give any such indication." Demonstration XVI related to pus and tubercle. It seems probable that the method of search for elastic tissue shown him by Dr. Andrew Clark at the London Hospital was described, as in the first edition of his Text-book Osler said that he had used the method for years.

At the end of the college year, in the spring of 1875, Osler was appointed Professor of the Institutes of Medicine, and early in 1876 a new position, that of Pathologist, was created for him at the Montreal General Hospital. Then, in the autopsy room, he began to lay an im-

portant part of the foundation for his future career. The published report of the first hundred cases, for the year ending May 1, 1877, "Dedicated to my Teacher, James Bovell, M.D.," was the first serious report of this kind from any hospital on this continent. Thirty-two cases of tuberculosis are included, of which 23 are described, some in detail. He published a second report in 1880 on a selection of 225 autopsies. Of the 42 cases given detailed description only 6 included tuberculosis in some form. Publication of the third report of the remaining 461 autopsies performed by Osler waited fifteen years for John McCrae. J. H. Pratt² comments interestingly on Osler's concept of acute pneumonic tuberculosis and the confusion that obtained about 1879, as shown by the description of a case in the second pathological report. Many of the papers on pathology published by Osler at this period contain references to tuberculosis in some form.

The local medical society, after the lapse of several years, had been reconstituted as the Montreal Medico-Chirurgical Society, in November, 1870. A month later Professor Howard "exhibited under the microscope very beautifully stained sections . . . executed by Mr. Osler (evidently not present), one of the students of the McGill Faculty." Osler was elected to the Society soon after his return to Montreal in 1874, but attended only one meeting before reading his paper on Miner's Lung the next summer. He and his young contemporaries newly appointed to the Faculty soon helped to make a lively, interesting society. His infectious enthusiasm, good-will, and cheerfulness did much to make the physicians in the city friendly with one another. In April, 1880, Mr. Duncan McEachran, Principal of the Veterinary College, introduced a paper for discussion, "The Transmissibility of Tuberculosis from Animals to Man".³ This related particularly to infection through milk. In discussion Osler said that it was notorious how many of these thoroughbred cattle had inflammation of the lungs, which ended in caseation, and this was reckoned by all veterinary surgeons as phthisis. The chief end of this discussion should be a proper milk inspection, not only of dairies, but of the milk brought into the city. In January, 1883, after giving a paper on "Para-

1. GWYN, N.: The Early Life of Sir William Osler, *Internat. Ass. Med. Museums, Bull.*, 1926, 9: 109.

2. PRATT, J. H.: Osler and Tuberculosis, *Internat. Ass. Med. Museums, Bull.*, 1926, 9: 59.

3. *Can. Med. & Surg. J.*, 1880, 8: 453.

sites in the Pork Supply of Montreal", Osler presented for inspection a specimen of extensive tuberculosis, or consumption, brought to him by the Inspector of the Abattoir. He said that an important question was whether the flesh and milk of consumptive animals could communicate the disease to man, but the evidence was as yet scarcely conclusive. The public, however, should get the benefit of the doubt, and the flesh of consumptive animals should be confiscated. Dr. W. W. Francis, of the Osler Library at McGill, was kind enough to search the early, unpublished records of the Society for me but found nothing about the contagiousness of tuberculosis before 1880. After 1879 the proceedings were regularly reported in the *Canada Medical and Surgical Journal*.

Elected full physician to the Montreal General Hospital in the spring of 1878, Osler apparently had but one period of service for three months during each year. The only clinical paper on tuberculosis published by him during the Montreal period was a lecture on a case of fibroid phthisis, given about a year before the announcement of the discovery of the tubercle bacillus. When addressing the students he said, "There is no disease that you will have greater difficulty in understanding than phthisis. It is in fact, at present, the bugbear of medical students. This is owing in great part to the inherent complexity of the subject, and in part, I am sorry to say, to the exceedingly diverse theories and views which at present prevail upon the pathology of the disease".

In the spring of 1882, Koch's discovery of the tubercle bacillus was announced, and reported in full in the *Canada Medical and Surgical Journal* two months later. The next month the *Journal* had a note to the effect that Professor Osler had demonstrated before the students the presence of the organism in the lungs of a man who had died of rapid tuberculosis. Although Osler's interest in bacteriology was keen enough to make him quick to confirm Koch's discovery he did not then pursue the subject further, because of lack of bacteriological technique.

During a second period in Germany, in the spring of 1884, when getting a late start in bacteriology with Weigert in Leipzig, Osler received the invitation to become Professor of Clinical Medicine in the University of Pennsylvania, which he accepted.

PHILADELPHIA

Work in the new field began that autumn. Osler's unconventional methods of teaching, so different from the formalities of his predecessors, were at first disappointing to the students. There had been no bedside instruction and no laboratory, but he took students with him into the wards and improvised a small clinical laboratory at the University Hospital, where his was the only good microscope. He introduced a convenient type of binaural stethoscope which had been made for him in London, and this shortly replaced the hitherto-used single-tube types. The university students soon followed him to the old "Blockley"—the Philadelphia General Hospital, originally a large alms-house—after his appointment to it in 1885 as Visiting Physician. Here there was a wealth of untouched clinical and pathological material for teaching and investigation. He aroused enthusiasm for this work, and actually did 162 autopsies, of which 48 were on cases of tuberculosis.⁴ Sunday was a gala day in the autopsy room, where he sometimes worked from eight o'clock in the morning until evening. From his prolific pen came many editorials at this time pertinent to the medical interests of the day. Sixteen articles in all related to tuberculosis but only two were original papers of his own.

The fine library of the College of Physicians, founded in 1787, and the club libraries of general literature found in Philadelphia, gave Osler opportunities for broad reading greater than he had previously enjoyed. Here, too, were traditions of the French school of medicine, to which he had been first introduced in Boston, on frequent visits from Montreal. The retirement of Professor Alfred Stillé, a pupil of Louis's, from the Chair of Medicine, had caused the changes in 1884 that had brought about Osler's appointment. That Osler delighted to talk with this charming old gentleman, from whom he learnt about Louis, whose work, especially on phthisis, had been an inspiration to him, is shown in his essay on Louis, read before the Stillé Society in 1897, and in his tribute to Stillé himself, also read in Philadelphia in 1902, some time after Stillé's death.

BALTIMORE

Osler's appointment in the fall of 1888 as

4. LANDIS, H. R. M.: *The Pathological Records of the Blockley Hospital, Internat. Ass. Med. Museums, Bull.*, 1926, 9: 232.

Professor of Medicine to Johns Hopkins University, and Physician-in-Chief to the Hospital, an integral part of the University, and then nearing completion, brought the opportunity for creating the ideal clinic long in his mind. The next May he left Philadelphia to begin his momentous work at Baltimore. The trustees had also chosen the three other chiefs of service for this unique hospital most carefully—W. H. Welch, W. S. Halsted, and H. A. Kelly. It is remarkable that all four professors were under forty years of age. Osler was the senior.

On his return from Europe in September, 1890, after his third "quinquennial brain-dusting", Osler felt that, having passed forty, he could no longer postpone the writing of a text-book, which he had long been considering. "The Principles and Practice of Medicine" was finished in little more than a year, and published early in 1892. It was the necessary complement to the ideal clinic. The article on tuberculosis was considered by reviewers to be one of its best. The classification of types of disease therein given has long been standard. A decade later he modestly wrote to his friend Musser, "Personally I think the only good thing I have done in connection with tuberculosis (though I have written a good many papers) is the article in my text-book, which Pepper always said was the best thing I had ever written."

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to improve the sanitary conditions of these institutions. This was apparently his first definite approach to public health measures for tuberculosis since his suggestions made at the discussions at the Medical Society's meetings in Montreal.

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The notification and registration of tuberculosis, urged by Fliek of Philadelphia and Biggs of New York for some years, was the subject of a discussion at the College of Physicians of Philadelphia early in 1894, to which Osler contributed briefly, strongly supporting the recommendations for action, which the College at that time defeated. In discussion he urged consideration of the factor of soil as well as seed, and the need of improving the former as well as controlling the latter.

Thirty-five years afterwards, Dr. H. W. Cattell of Philadelphia, in a letter to the *London Lancet*, told of this meeting, when the Hall at the College was so packed by students anxious to hear this former professor of their university, that there was but little room for the Fellows. Cattell's innocent invitation to a few of his class had been too freely interpreted by the students, who, when he arrived, "seemed like the sands of the sea". He was consoled by Osler's evident enjoyment of his embarrassment, when, to comply with regulations, he introduced his guests.

The long-desired medical school for Johns Hopkins University became a fact in 1893, but the students did not come to the hospital until two years later, the first class of fifteen graduating in 1897, of whom the majority entered the hospital for service. Other members of the staff and an occasional student during these years had fallen out because of tuberculosis, and these break-downs had become a grave matter of concern to the heads of the hospital. In the ninth Report of the Superintendent, 1898, a fund for the study of tuberculosis is mentioned as having been given to the Hospital, one of the first donations ever made to it.

During the previous autumn, after my return from postgraduate study in England, I made a long-desired visit to Baltimore, on the suggestion of Dr. W. S. Thayer whom I had met in England, to see Professor Osler at work in his wonderful clinic. He was quite unlike any other great physician I had met, both as a personality and as a teacher—combining so much knowledge, wisdom, culture and charm. His friendliness encouraged me to ask to work for him, notwithstanding the slight chance of an opportunity, because I knew that all places had been filled by the newly graduated class from the medical school. Great was my surprise and delight to receive a letter from him soon after my return home offering me the opportunity to do some work on tuberculosis, made possible, he said, by a special fund in part supported by two ladies whom he had lately interested in this subject. Later he took me to call upon the ladies, but I afterwards learned that he himself had probably been the chief contributor to the fund. In six weeks I was again in Baltimore to try to carry out his wishes, and I remained there a year and a half.

Osler saw a great opportunity in a field in which, in North America, there were as yet

few workers. He wished to bring about the segregation and more intensive study of dispensary cases; to develop a laboratory in which the special culture of the tubercle bacillus should be undertaken, and animal inoculation could be carried out, in order to verify the recent work of Le Damany on pleuritic effusion, since he himself had been long interested in serous-membrane tuberculosis. A large group of histories relating to this subject were also to be analyzed; a special library collected; and a society formed, to be called after Laennec, in order to stimulate the study of tuberculosis. He ever found some way to satisfy the workings of a mind teeming with ideas or to develop some constructive work. There was opportunity to see his methods occasionally when he was teaching the junior class at the dispensary, and to follow him from time to time on ward rounds. Osler's daily visit was the event of the day.

During the school year 1898-99, he had also inaugurated the visiting of dispensary cases of tuberculosis in their homes. He was anxious to learn just what were the conditions under which they lived at home and to bring competent advice to them. Two third-year students—Miss Blanche N. Epler⁵ for the 1898-99 semester and Miss Adelaide Dutcher⁶ for the next year—volunteered successively to do this work, for which the fund for tuberculosis study was used. This house-visitation to poor tuberculous patients by these trained women marked the very beginning of "hospital social service". Osler's relation to it and the pioneer work of these two ladies have been shadowed by or forgotten in the emphasis soon to be given to the development of social service as a hospital function. Two other students, Miss Elizabeth H. Blauvelt and Miss Esther Rosenerantz, continued this service for two more years, when a visiting nurse took over the work.

There was cause for further concern about the health of the students at that time, as, in the class of 1899 alone, four students had developed tuberculosis. Lawrason Brown, too, had been sent for treatment to Dr. Trudeau, and John Bruce MacCallum, who also was to graduate a year later, had begun to show signs of the disease. That autumn Osler read his first paper on the "Home Treatment of Consumption" before the Faculty of Maryland. The great prac-

5. Proceedings of Johns Hopkins Hospital Medical Society, *Bull. Johns Hopkins Hosp.*, 1900, 11: 331.

6. *Ibid.*

Professor of Medicine to Johns Hopkins University, and Physician-in-Chief to the Hospital, an integral part of the University, and then nearing completion, brought the opportunity for creating the ideal clinic long in his mind. The next May he left Philadelphia to begin his momentous work at Baltimore. The trustees had also chosen the three other chiefs of service for this unique hospital most carefully—W. H. Welch, W. S. Halsted, and H. A. Kelly. It is remarkable that all four professors were under forty years of age. Osler was the senior.

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The notification and registration of tuberculosis, urged by Flick of Philadelphia and Biggs of New York for some years, was the subject of a discussion at the College of Physicians of Philadelphia early in 1894, to which Osler contributed briefly, strongly supporting the recommendations for action, which the College at that time defeated. In discussion he urged consideration of the factor of soil as well as seed, and the need of improving the former as well as controlling the latter.

tical problem was, he said, how best to treat the 95% of patients who could not leave home. Dr. Charles S. Millet⁷ had been invited to speak at this Maryland meeting, and urged the value of sleeping outdoors as a method of treatment. He was the first to recommend the use of unlimited night air—advice that was soon widely adopted.

The Laennec Society—a society for the study of tuberculosis—long in Osler's mind, was organized on October 30, 1900. Its single purpose was to be the study of tuberculosis in the broadest possible sense, and it was the first society ever to be devoted to this purpose. At the inaugural meeting he spoke "On the Study of Tuberculosis", and then introduced Miss Dutcher, who, in a paper entitled "Where the Danger Lies in Tuberculosis",⁸ reported a study of the social and domestic relations of 190 tuberculous out-patients whom she and two other students had visited, giving details of the appalling conditions under which the poor consumptive lived and of the inevitability of infection arising from him. This society met monthly and became important as a stimulating centre of interest for the developing anti-tuberculosis campaign.

Knowledge of Trudeau's successful work had, towards the end of the century, encouraged the building of sanatoria for the treatment of patients nearer home. One of these was the Muskoka Cottage Sanatorium at Gravenhurst, Ontario, established by the National Sanitarium Association, and opened at midsummer, 1897. This was shortly placed in charge of Dr. J. H. Elliott, a stalwart in the tuberculosis field in Canada now for forty-five years. Dr. Osler corresponded with him about patients in whom he was interested, and became a contributor to the work of the Association from 1898 until he left the United States. This practical evidence of interest was of great value to the Association, and illustrates his far-reaching support of useful enterprises.

An effort was also being made at that time in England to form a national association for the study of the disease, and in the summer of 1899, at a meeting of the British Medical Association, Dr. T. Clifford Allbutt, Regius Professor of Medicine at Cambridge, opened a discussion of the subject of prevention and

remedial treatment of tuberculosis. Osler joined in the discussion, stressed the efficacy of home treatment and, with other essentials, urged "rest so long as fever is present"—a principle mentioned for the first time by him in the recent third edition of his Text-book.

The International Congress on Tuberculosis held in the summer of 1901 had been brought to London through the initiative of the new National Association for the Study of Consumption and Other Forms of Tuberculosis. Professor Osler was Chairman of the American Committee to prepare for this, and also one of several delegates from the United States, on whose behalf he addressed the Congress. He referred to the energy and zeal already being given to the anti-tuberculosis work in the United States. His concise, humorous, effective speech greatly interested H.R.H. the Duke of Cambridge, the President. He also engaged in the discussion of three subjects relating to public health, pathology and diagnosis. The great event of this meeting was Robert Koch's address on the difference in transmissibility of human and bovine bacilli to man and cattle, later productive of so much discussion and research. Cushing quotes Mrs. Osler as writing at this time that her husband was "tuberculously daft".

In the spring of 1901, at the invitation of Osler, Dr. Lawrence F. Flick, who for years had done outstanding pioneer work in Philadelphia, gave an address in Baltimore before the Clinical Society on "The Registration of Tuberculosis", in which he said that both Philadelphia and New York had already enacted this measure. By the end of that year great local interest about tuberculosis was aroused and a big public meeting, held under the auspices of several societies, was addressed by speakers with conviction regarding measures that should be undertaken to control it. Osler had recently waged a strenuous campaign against typhoid fever in Baltimore and elsewhere, which was now having results, as had been the case with his earlier crusades against malaria, trichinosis and smallpox. At this meeting, in a "fiery" speech,⁹ he arraigned the complacency, indifference and ineptitude of the Mayor and Council, and called upon the citizens to wake up and take effective action. The audience was thrilled,

7. MILLET, C. S.: The Night-air of New England in the Treatment of Consumption, *Maryland Med. J.*, 1900, 43: 12.

8. Phila. *Med. J.*, 1900, 6: 1030.

9. JACOBS, H. B.: Osler as a citizen and his relation to the tuberculosis crusade in Maryland, *Bull. Johns Hopkins Hosp.*, 1919, 30: 205.

and action was soon forthcoming. A Tuberculosis Commission, previously recommended by the local Board of Health, was created at the next meeting of the Maryland Assembly, with Dr. William S. Thayer as the President and Drs. John S. Fulton and Henry Barton Jacobs members. This Commission ultimately accomplished much, and, in December, 1904, brought about the organization of the Maryland Society for the Prevention of Tuberculosis, of which Dr. Jacobs was long the president. Osler presided at the meeting of organization.

In order to realize her husband's wish that special nurses should visit patients in their homes, Mrs. Osler raised a fund for this purpose in 1902, and the first special nurse went on duty under the Instructive Visiting Nurses' Association, thus replacing the visiting of patients by students. "It is Dr. Osler to whom we owe the idea of special nurses for visiting in the homes of tuberculous patients. He foresaw that good would result to the community by reason of this house-to-house visiting and instruction."¹⁰ The value of this nurse was soon demonstrated, and the number of visiting nurses was gradually increased through other agencies.

A professional relationship with Mr. Henry Phipps which developed about this time may have led Osler to tell Mr. Phipps of the conditions disclosed by the student-visitors in Baltimore. Great was his surprise, however, when in Paris in 1903, to receive, through Dr. Flick, an informal draft from Mr. Phipps for \$10,000. This sum, soon doubled by Mr. Phipps, made possible a tuberculosis dispensary at the Hopkins, which, as the culmination of his efforts in the local fight against tuberculosis, was formally opened a short time before Osler left Baltimore. Further gifts from Mr. Phipps doubled the capacity of the Phipps Dispensary in 1908, where, under the direction of Dr. Louis Hamman, a much extended work was made possible.

In December, 1903, Professor Osler gave one in a series of lectures at the Henry Phipps Institute of Philadelphia, his subject being "The Home in its Relation to the Tuberculosis Problem". This brilliant address, in which Osler was in full panoply, was prepared under the handicap of illness, but was perhaps the most delightful of his many technical arti-

cles. An editorial¹¹ at that time says "Osler's paper is so scientific, practical, and inspiring that it should be read by every physician". None of his addresses shows a more remarkable range—the sympathy revealed in the introduction; the historical survey showing the evolution of knowledge about tuberculosis; and the reference to the three recent pieces of work of the first rank relating to tuberculosis done in America: that of Trudeau on the importance of early sanatorium treatment, that of Biggs on city organization, and that of Flick in the demonstration of the dangers of home infection. The disclosure of his own students of the distressing and disgraceful conditions existing in the houses of the poor in Baltimore was a further stimulus to find prompt relief. Since not more than 2% of patients could take advantage of sanatorium or climatic change, a sound treatment of the patient at home was of first importance. The practicability of adopting the measures suggested by modern research was discussed and methods for realizing them outlined. The Parable of the Sower as an allegory, so happily used in his Text-book article on tuberculosis to illustrate the relationship between seed and soil, and so pertinent to the present problem, was further elaborated. At this time Osler was preparing for the Ingersoll Lecture on "Science and Immortality" to be given the next spring, and it is not surprising that the mystic writings of Avicenna,¹² read during the previous summer, should have given the cue to his introduction about the dreadful mortality of tuberculosis—"If the ears of your hearts are opened you can hear, as I speak, the beating of the wings of the angels of death hastening to the four hundred appointed for tomorrow". In concluding, he quoted De Quincy, who has compared the many predestined to tuberculosis to the blazed trees marked by the forester as ripe for the axe. To the despondent relatives, who had hitherto vainly asked whether there might be any hope for the afflicted, he gave encouragement based upon the recent triumphs of scientific medicine.

A Tuberculosis Exposition,¹³ projected by the Tuberculosis Commission of Maryland as a means of popular education, was held in January, 1904. It was planned to display the results

10. Report of Maryland Association for Prevention and Relief of Tuberculosis for 1907-08. p. 22.

11. *Maryland Med. J.*, 1904, 47: 149.

12. MEHREN, A. F.: *Traité mystique d'Avicenne*. "L'Oiseau". Fasc. II, E. J. Brill, Leyden, 1921.

13. *Maryland Med. J.*, 1904, 47: 28, 33-154, 157.

of the Commission's investigation in such a way as to make a powerful appeal to the public mind. Although H. B. Jacobs was the Chairman of the General Committee, Osler served on this and on four special committees.¹⁴ The Exposition involved an enormous amount of detail for him during the year of preparation. His obvious part in it was an impromptu lecture on the history of tuberculosis, which illustrated the exhibition of a remarkable collection of books on tubercle,—landmarks from Hippocrates to Koch, and the works of modern writers. The lecture room had to be abandoned for a special hall because of the crowd. The Exposition was most successful in arousing the interest of the general public, even in the technical lectures, and showed that universal participation in the scientific knowledge of tuberculosis was of great importance in a country where all reforms wait upon public opinion. It proved to be the model for the many similar ones staged in the future in various parts of the country. It was also well-timed, because two unrelated groups interested in tuberculosis had been planning international gatherings to be held in the United States. Dr. S. Adolphus Knopf took advantage of this assemblage of leaders in the anti-tuberculosis campaign to interest them in creating a truly national organization to direct it. Its formation was completed the following June at Atlantic City.

The first annual meeting of the new National Association for the Study and Prevention of Tuberculosis was held at Washington on May 18, 1905, under the presidency of Dr. Edward L. Trudeau. Osler, as Vice-president, spoke about the important problem of the education of both the profession and the public. To make effective the knowledge now obtained was the major problem, and he outlined a comprehensive program which could be carried out.

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14. Report of Tuberculosis Commission of the State of Maryland. 1902-04.

15. KLEBS, A. C.: Osler at the Tomb of Louis, *J. Am. M. Ass.*, 1906, 46: 1716.

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During the summer of 1909, Miss Mabel F. M. Price, who had long been familiar with the sad prevalence of tuberculosis in a suburb of Oxford and with the general apathy and hopelessness of the people about it, invoked Professor Osler's interest in local conditions. Apparently he was already aware of them and took action at once. A discussion was held at his house in order to consider what steps should be taken for the prevention of consumption in the county. It was decided to hold a Conference and Tuberculosis Exhibition during a whole week in November, for which two Oxford medical societies later assumed responsibility. Osler was able to arrange that the exhibition of the National Association for the Prevention of Tuberculosis should visit Oxford. A privately printed pamphlet, again entitled "What the Public can do in the Fight Against Tuberculosis", embodied the substance of his address. This was a modification of that on the same subject given two years before at Dublin. As an immediate result of this very successful Conference and Exhibition a branch Association of the National was formed at Oxford in January, 1910, of which Osler was the first President, and Miss Price the Honorary Secretary for many years. A practical outcome was that the Oxfordshire Association for the Prevention of Tuberculosis was established, and a tubercu-

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lasis dispensary was opened at the Radcliffe Infirmary. A tuberculosis officer, Dr. William Stobie, specially trained in the school of Dr. R. W. Philip (later Sir Robert Philip), of Edinburgh, and two staff nurses were appointed. Dispensaries were, from time to time, opened at eight other centres. Osler himself entered the local campaign in order to arouse interest and to gain financial help. For six years he gave one morning a week to consultations at the dispensary, also often going far afield on consultation with the tuberculosis officer. Throughout the busy years he faithfully attended the monthly meetings of the local Association, of which he was President for nine years, giving it great moral support. The expansion of the work of the newly formed Oxfordshire Association did not develop without some local opposition which he gradually overcame. In an Oration given before the Osler Club of London in 1931, Dr. Stobie¹⁷ said, "Oxford was the pioneer of the dispensary system in rural areas, an enterprise due in no small measure to the enthusiasm of Miss Mabel Price and the energetic backing of the Regius Professor of Medicine."

After the enthusiastic beginning of the work of the National Association, resulting in the organization of the British Congress on Tuberculosis in 1901, there was a steady loss of influence and support. By 1909 the low-water mark in income of three hundred and forty pounds had been reached. In June, 1910, a special committee, which included Osler, made its first approach to the public for an income of five thousand pounds. His letter at this time to Dr. H. B. Jacobs, that Mr. Waldorf Astor (later Viscount Astor) had undertaken to finance the anti-tuberculosis campaign is significant.

The success of the meetings at Dublin and Oxford encouraged the National Association to alter the hitherto invariable custom of holding the annual meeting in London. The suggestion came from Dr. R. W. Philip, of Edinburgh, who had initiated the dispensary treatment of tuberculosis twenty-three years before. Edinburgh was accordingly chosen for the meeting in July, 1910. Osler, Vice-president of the Association, was the President of the Conference. On the Sunday immediately preceding, a Memorial Service for Robert Koch,

who had died two months previously, was held for the University students. Twenty-five hundred persons attended the service, at which Osler gave as a lay sermon "Man's Redemption of Man". In this he said, "Tuberculosis is one of the great infections of the world, and it has been one of the triumphs of our generation to determine its cause . . . How to make this knowledge effective is the prime reason of this Conference." The Conference was a momentous one. The recent intimation by the Chancellor of the Exchequer that a national system of invalid insurance would be introduced next year caused much discussion. A resolution was ultimately passed to call the special attention of the Government to the great importance of giving the control of tuberculosis a prominent place in the proposed scheme. When summing up the results achieved at the Conference, the President spoke apprehensively regarding state intervention in matters relating to tuberculosis.

The executive committee of the Welsh Memorial to Edward VII announced shortly after the Coronation of King George V in June, 1911, that the two hundred thousand pounds collected was to be devoted to a campaign against consumption in Wales and that a statement had been obtained from Sir Clifford Allbutt, Sir Lauder Brunton, Dr. A. Latham and Sir William Osler on the value of sanatorium treatment of the disease. The public interest aroused by this unusual form of memorial may also have influenced the Chancellor of the Exchequer, Mr. Lloyd George, to make provision, as part of the National Insurance Act, for two and a half million pounds to aid anti-tuberculosis effort.

The National Insurance Act of 1911 brought about the appointment the next year by the Government of a Departmental Committee on Tuberculosis, of which Mr. Waldorf Astor was the chairman. Its function was to report at an early date upon the general policy to be followed regarding the problem of tuberculosis in the United Kingdom. Although Osler was not a member of this Committee, there is no doubt that his advice was often sought. At this time he freely discussed projects, pending or desirable, in *The Times* as well as in the medical journals. In the Committee's Final Report, published in 1913, there is a special appendix on the Oxford Dispensary Scheme, submitted by Dr. N. D. Bardswell, who considered it a model and emphasized the improvement in hygienic living generally to be noted

17. STOBIE, W.: Osler and Tuberculosis, *Brit. J. Tuberc.*, 1932, 26: 23.

in areas controlled by the Oxford Association.

A further progressive step in organization of effort brought about by the National Insurance Act, was the appointment in 1913 of a Medical Research Committee, one purpose of which was to direct, control, and correlate investigations of the etiology, pathology, and other aspects of tuberculosis. An Advisory Council for Medical Research was also appointed to advise the Minister responsible for National Health Insurance about the proposals made by the Medical Research Committee. Osler was a member of the Advisory Council, and so had the opportunity to be a guiding force in the councils controlling the campaign against tuberculosis.

The organization of the Oxford Association, and conferences with the Government about central control of the tuberculosis problem made many calls upon Osler throughout 1912. Compulsory notification of every form of tuberculosis in Great Britain became effective early in 1913. At a meeting of the Oxford Association in 1915, attended by various Government officials interested in tuberculosis organization, he presided and moved resolutions relating to reaching patients through the dispensary system, to the urgent need of provision for the care of advanced cases among the poor, and to the social services relating to present and after-care.

The program for the annual Conference of the National Association in London in 1911 showed the enormous interest that had now developed about tuberculosis. All the main factors in a successful campaign were discussed. Osler presided at one meeting and in an introductory address covering many points referred to the necessary education of the profession. There was too much carelessness in examination among doctors, which would tend to increase under the worst of all systems that was to be forced upon the profession—contract practice. He also urged the closer association of the tuberculosis dispensaries with the general hospitals, whose duty it was to assist the work with their laboratory facilities and social service agencies. He dreaded especially the narrowing effect of one type of work upon a group of men working solely in tuberculosis dispensaries.

The annual meeting of the National Association was held in 1914 at Leeds. Many speakers took part in the symposia on "The Home in Relation to Tuberculosis" and on "Domestic Treatment". Osler opened the discussion on the latter subject by a paper on "The

Home Treatment of Tuberculosis".¹⁸ This was the most complete address relating to this oft-stressed subject that he gave in the British Isles, and the fullest reported. An urgent appeal was made to the public for action. His concluding sentence contained a quotation which we have recently heard applied to a very different situation: "Meanwhile who dare say 'the struggle naught availleth', when, month by month and year by year, thousands are saved who would have otherwise perished in a miserable, lingering and untimely death." In London, at the meeting of the National Association held in 1916, Sir William gave an address (one of the few printed in full) on "The Tuberculous Soldier", which said much that was needed to influence government, profession and public, with which we have all become more or less familiar since the Great War. The Association reproduced his suggestions in a report to the Government, but the Council determined that military restrictions invalidated part of the recommendations. Osler's final illness in the autumn of 1919 prevented his promised address to the National Association for the Prevention of Consumption, to which he had long given such great support.

The "Future of the Medical Profession under a Ministry of Health" was the subject for a discussion at the Royal Society of Medicine in 1918 that was opened by Osler. A culmination of the several efforts being made in the anti-tuberculosis campaign was partly reached in the Ministry of Health Act, 1919, of which the *British Journal of Tuberculosis* spoke approvingly.

During the Oxford years his American friends working in the field of tuberculosis were ever in Osler's mind. References to his interest, evident in so many ways, are to be found scattered throughout the second volume of the "Life", and reveal that intimate friendliness so natural to him and so precious to those privileged to be included in it. Encouragement often went directly to men who were getting things done—or commendation of their efforts to others. A few of the papers contributed to the Memorial Volume,¹⁹ edited by Dr. Maude E. Abbott, show further how Sir William main-

18. Transactions of the Sixth Annual Conference of the National Association for the Prevention of Consumption, Bartholomew Press, London, 1914. (Several addresses by Osler reported in the annual transactions of this association are not listed in the "Bibliographies").

19. *Internat. Ass. Med. Mueuris, Bull.*, 1922, 2.

tained his intimacy with the work and the workers. The "Bibliographies" also record the many contributions of both a professional and literary kind, relating in some way to tuberculosis, that he sent to the United States and Canada.

After 1909 Osler helped tuberculosis work in various ways besides giving support to the larger special societies. His activities may be followed in the medical journals and often in the lay press. He attended many meetings of the British Medical Association and the Royal Society of Medicine, where he discussed the theoretical and practical problems of the day relating to tuberculosis. Appointed to the Royal Commission on Education in Wales, in 1916, he sought to bring the tuberculosis men into the field of postgraduate education. When Vice-president of the Tuberculosis Society—founded in 1911 for Tuberculosis Officers working under National Health Insurance—he gave an address in March, 1919, on "Acute Pneumonic Tuberculosis" at the London Hospital. For this lecture he collected specimens from several hospitals and museums. This disease had been of special interest to Osler and was the subject of his last clinical lecture in England, as it was for his last address given to a clinical society a short time before he left the United States. He wrote few formal papers on tuberculosis during the Oxford period. The "Bibliographies" record twenty references related to this subject in the medical or lay press. During the war Osler was an Honorary Colonel and held appointments to eight hospitals, in some of which he had a consultative relation to tuberculosis. The value of his oversight is well known to many who are here today.

On August 30, 1917, came the dread message that his only son, Revere, had been killed in action. Sir William was working on the revision for the ninth edition of his Text-book at the time. Later he wrote to me, "We are taking the only medicine for sorrow—time and hard work". His sorrow, his continued anxiety about the war, his professional work, the preparation for the presidential address to the Classical Association in May, 1919,—a supreme achievement—and the seventieth birthday emotion combined to impair his health. A good holiday after the birthday, on the island of Jersey, was a help, but late in September a distant consultation necessitated a fatiguing motor journey during the railway strike. The expo-

sure incurred caused another severe cold, which was followed by complications from which he died December 29, 1919.

The much desired sanatorium-hospital for which Osler had begun the collection of funds in the early days of the Oxford effort was ultimately realized early in 1927 by the completion of the Osler Pavilion at Headington, as a branch of the Radcliffe Infirmary at Oxford. The need of providing for tuberculous ex-soldiers, and their dependents, and for the district in general, caused the British Red Cross Society to contribute fifteen thousand pounds. Twenty thousand pounds was raised by public appeal and a very complete sanatorium-hospital was built. It is said to be a worthy memorial. Lady Osler left a bequest of two thousand pounds to this pavilion.

Occasional writers have mentioned Osler's early and sustained interest in tuberculosis. This became intensified as the campaigns against malaria and typhoid fever developed and required less support from him. The crusade against tuberculosis was well advanced when he left America. In England, where Osler had no great teaching clinic to absorb his professional knowledge and skill, he found a restricted outlet in prosecuting measures for improving health. Control of tuberculosis was a crying need in the British Isles, which contained a large population in a small area. Public interest had been but slowly stirred, but the success of the American effort and Osler's part in it were known in England. The combination of his ripe experience and engaging manner of address was incomparable. No voice could have been more powerful in arousing the profession and public to action.

Throughout the English-speaking world Osler's death evoked widespread, heartfelt expressions of regret. However opinion may differ as to which of his achievements was the greatest, men who knew him remember first the wonderful influence of his radiant personality in stimulating and inspiring others. The memory of this great man is perpetuated by the dedication to him of Libraries and Halls, and by the Societies that have been named for him. The latter have been formed more especially by medical students, to carry on the study of his writings and the history of medicine, to which he had been so devoted. May these triennial addresses help us to keep him ever in proud remembrance.

WHERE WE FAIL IN THE DIAGNOSIS AND TREATMENT OF HEART DISEASE*

BY JOHN A. OILLE

Toronto

WHEN this title was suggested, it appeared both unusual and attractive, because this science in Medicine comes to all of us. Mistakes in diagnosis have their origin in carelessness, ignorance, the difficulty of the case, and reliable information.

Carelessness.—This may be partly justified or not, depending on whether the doctor has time and opportunity to investigate the case.

Now, during war, most doctors in civilian practice are over-worked, especially in small communities, near a military camp.

Many mistakes are due to *poor questioning*, for instance, in eliciting all the details of the pain in the chest or arms. The patient might tell you that walking brings it on, when in fact, the pain does not come on during walking but afterwards, possibly some hours. When a pain occurs, the following details should be investigated: *location*, duration, character, precipitating factors and accompanying symptoms. It is surprising how difficult it is to find the exact location of a pain. Some time ago one of our doctor friends and teachers was ill with an attack resembling cardiac infarction. On being asked to indicate the situation of his pain, with great care he raised his hand and looked at his abdomen and pointed to a point immediately above his pubic bone. A few minutes later, he casually mentioned that the pain was right under his xiphoid.

To define location, one asks "Is it always in the same spot or does it shift, and where else in the body do you have pain?" Patients often have a dozen pains, and complain only of the one that they think is important. The radiation to the arms has been commonly and incorrectly taken as evidence that the pain is cardiac. Neuritic pains of various origins have the same radiation. The only diagnostic value of radiation down the arms is that it excludes disease below the diaphragm.

While it is said that the pain of angina can be located anywhere from the jaw to the eighth

dorsal segment, including both arms, there are two or three regions within this area of the body in which angina is almost never situated, namely, the axillary regions and the submammary regions, that is, between the nipple and the costal margins.

The *duration* of the pain is an important differential diagnostic point. Angina lasts roughly from one to thirty minutes, averaging about three minutes. A patient's statement of the duration of the pain can often be misleading. When he says fifteen minutes, he might mean that a little stab of pain, lasting only a second, keeps recurring for fifteen minutes. The stab is too short in duration to be angina, whereas the fifteen minutes would fit it all right. Pains lasting for hours or days are obviously too long for angina. In this connection, their *frequency* is important. For instance, if they have been coming daily for months or years, they have come much too often for coronary occlusion. Therefore, the first time spondylitic pains occur is the most difficult time to distinguish them from cardiac pains.

There are a few mistakes based on the *character* of the pain. Occasionally a patient will say he has no pain in the chest, because the distress he gets when walking he does not consider to be pain. Obviously, such distress as tightness, fullness, compression, etc., are varieties of pain or suffering. In the minds of most patients, pain is considered to be a sharp sensation, and even aches are not called pains. Angina is a wave of pain and is never a stab, a prick or a stab. Angina does not change its character in the same patient; that is, it is never a sharp stab followed by a dull ache.

In angina, the most important *influencing factor* is exercise or excitement. One must find out exactly what the patient is doing at the instant the pain occurs; frequently patients will tell you they get a substernal pain only after eating, when in reality the pain comes on only in walking after eating. Angina comes during exertion, not afterwards. Angina results from anoxia of the myocardium. The time factor is

*Read before the Section of Medicine, Academy of Medicine, Toronto, January 13, 1942.

essential in the production of anoxia in any muscle. Therefore one must not be misled from the diagnosis in a patient whose pain occurs from walking a block, but not from walking up two flights of stairs. Certain factors will produce angina more easily, such as a full stomach, cold weather, a wind, anxiety, hurrying or fatigue. Apart from these considerations, however, there is a constancy about the degree of exercise which produces angina in the same patient. One cannot diagnose angina when a pain occasionally or even frequently comes on while walking, because the same pain may come on sitting and lying, and sometimes the patient can walk well or far without it. However, a real angina can come on sitting or lying in a patient whose disease has advanced so that walking a few yards will bring on angina.

Accompanying symptoms are sweating, salivation, urination and occasionally shortness of breath. One is often surprised however, at how frequently shortness of breath is absent. The fear of death is more often present in cardiac neuroses than in real anginas.

The commonest source of error in diagnosis is lack or inefficiency of *physical examination*. Congestive failure is frequently overlooked because a patient has no œdema of the legs, and the doctor neglects to find out the size of the liver. In right ventricular failure the liver is enlarged much more frequently and earlier than the occurrence of gravity œdema. Patients therefore often go around for weeks or even months with passive congestion of the liver, not diagnosed because it was not looked for. Similarly, the presence of a mitral diastolic murmur may be unsuspected because the examiner failed to turn the patient on the left side to listen for it. Physical examination should be complete enough in regard to all systems to find out what additional diseases the patient may have. In one year, while examining for heart disease I found three cases of tumour of the descending colon.

Failure to do necessary investigation is a very common source of error. Many people have a pain somewhere in their body that could be coronary occlusion. In such a case, especially one in whom pain is the only evidence, either investigation is omitted entirely or the patient is put to bed for a few days without even systematic temperatures being taken, and is allowed up when the pain disappears. A suspected case of coronary occlusion should be kept in bed for

a week, or, possibly, longer and have the temperature, white count, and electrocardiograms systematically taken.

The reverse often happens. In such a suspicious pain, even if it be confined to the epigastrium, the patient is often kept in bed for six or eight weeks without any confirmatory evidence or investigation.

It is always an excellent plan not to be driven to make a positive *diagnosis the first time* a new patient is examined, unless it be obvious and certain. Patients, especially children, with active heart disease (rheumatic) are not kept in bed long enough. We often fail to investigate cases of chronic rheumatic endocarditis for evidences of activity. These are fever, leukocytosis, increased sedimentation rate, and in the absence of any of the foregoing, persistent fatigue, gradually increasing shortness of breath on exertion, and progressive enlargement of the heart from year to year. Congestive failure itself is very often due to a period of activity.

Some of us fail to do a sufficient number of *Wassermann tests*. This is no doubt due to the fact that in Ontario patients with positive Wassermans are becoming rare. For some years the percentage has been below two in hospital patients, in Toronto. It will probably increase during war years.

2. *Ignorance or inefficiency*.—As with carelessness, ignorance also may be justifiable or not. Every doctor should know that a pulmonary systolic murmur which disappears on inspiration or standing is not due to valvular disease, and is due to a normal anatomical fact; *viz.*, that the diameter of the pulmonary artery is often sufficiently greater than the diameter of the pulmonary valve orifice to produce a murmur. The same may be true of the aorta in children or young adults, because they also can have an aortic systolic murmur transmitted up the vessels of the neck which disappears on standing up. On the other hand, every doctor would not be efficient enough to diagnose emphysema of the mediastinum or a hyperactive carotid sinus reflex.

One of the commonest difficulties in the diagnosis of heart disease appears to be the ability to assess murmurs. Many people think they have heart disease because they have been told they have a murmur. The great majority of such patients have no valvular disease at all. While it is quite beyond the scope of this paper to discuss in detail all murmurs, yet one or two

points must be mentioned. When a systolic murmur is heard, maximum over any of the valve areas, it is a very common mistake to do nothing to investigate the murmur. The most important thing to do of course, is to try to abolish it by listening during inspiration and during expiration, and while holding the breath on deep inspiration, and on deep expiration. Cardio-respiratory murmurs will be absent during some time in this cycle. Then the effect of posture should be tried. The murmur should be listened for through all the phases of respiration, both lying and standing. Any systolic murmur which can be made to disappear by standing up, or breathing, or exercise, is unimportant.

In connection with diastolic murmurs doctors often have one misconception, namely, that murmurs are inconstant. This is not at all true of the murmurs of mitral stenosis. In cases of severe failure, or with any disease, such as pneumonia, which interferes with complete emptying of the left ventricle, a mitral diastolic murmur may disappear. Aortic diastolic murmurs practically never disappear.

Enlargement of the heart is a much more difficult thing to determine by physical examination than is endocarditis. It is commonly thought that the P.M.I. of the apex beat is slightly medial to the left border of the heart. This is true only in normal-sized hearts. With enlargement, the apex beat is almost always outside (to the left) of the left border of the heart, and the larger the heart is, the farther to the left the apex beat shifts.

It is a very common and serious mistake to diagnose a vascular hyperreactor as a cause of essential hypertension. During physical examination the blood pressure, if found elevated, should be estimated several times while the patient is lying down. It should then be estimated after the anxiety of the examination is over, when the patient is dressed and sitting down, when it will usually be found to be lower, and often very considerably lower, as much as 100 mm. Estimation of blood pressure should be done in a casual and reassuring manner.

Once essential hypertension is diagnosed, the patient is frequently made worse by poor treatment. The importance of the disease is over-emphasized and the patient's anxiety is increased by unnecessary restriction in exercise, by omitting protein and salt from the diet, by having him return frequently to have the blood

pressure checked, and by making unfavourable or serious remarks about his condition.

Mistakes often arise through an exaggeration in the mind of the doctor of the value of *electrocardiograms*. As the use of a new instrument increases, there is a constant increase in new interpreters, who necessarily make more mistakes than an experienced interpreter. The commonest mistake is to make a diagnosis of myocardial damage or serious myocardial damage from a trivial abnormality in the electrocardiogram. Another mistake is to consider every change in an electrocardiogram to be due to coronary atherosclerosis. The American Heart Association recently have listed forty conditions, apart from coronary atherosclerosis, which can produce changes in the ST and T segments.

The diagnosis and possible seriousness of peripheral emboli are both frequently overlooked. When a patient with a recent cardiac infarction, or mitral stenosis, or auricular fibrillation, and, of course also, subacute bacterial endocarditis, gets a pain in any of the extremities, arterial occlusion by emboli should be the first thing one should think of. The arteries distal to the pain should be examined for pulsation, and immediate treatment given. Medical treatment will avert gangrene in a large percentage of cases of embolism, even in the lower end of the aorta, and is superior to embolectomy, excepting in most skilful hands and when heparin is used to prevent thrombosis at the site of operation. In such cases, three things should be done, two of which are always possible. Half a grain of papaverine should be given intravenously every three hours. Heat should be applied to any other part of the body not involved. If available, Pavaex treatment should be started at once. It can usually be decided within three or four hours, with a fair degree of certainty, whether or not medical treatment will be successful in preventing necrosis. If one decides that medical treatment is hopeless, and the underlying disease of the patient is not too serious, an embolectomy with heparin should be considered.

3. Difficulty of diagnosis.—Diagnostic difficulties gradually increase, up to major disabilities.

The diagnosis of *angina pectoris* is usually easy, unless the pain be in some odd place or obscured by several other pains in the chest, or there be a language difficulty. The chief difficulty with angina is the handling of it, be-

cause most patients with angina are not told of it at its beginning. At its onset, patients should be put to bed for six weeks, as, in the great majority of cases, it is due to coronary occlusion, with insufficient collateral circulation. It is a source of comfort to patients with angina to be told that when they walk so far and get distress in their chest, or other places, and have to stop, they are not in any danger of dying. This is safe to tell patients, because it is almost universally true.

Pulmonary embolism resembles coronary occlusion very closely. As a general rule, in coronary occlusion, there is more pain than in pulmonary embolism. In the latter, there is more shortness of breath than actual pain. The circumstances under which the attack occurs is of help. If it comes soon after an operation or confinement, the chances are very much in favour of pulmonary embolism, even though no evidence can be found of venous thrombosis. Pulmonary embolism is often the first sign of venous thrombosis. The subsequent finding of physical signs in the lung, especially the coughing of blood, is in favour of pulmonary embolism, although the majority of cases do not cough blood. The electrocardiogram may be conclusive of cardiac infarction. However, a fair percentage of cases of cardiac infarction have an atypical electrocardiogram. Contrary to what one might expect, the electrocardiographic changes in pulmonary embolism have no standard pattern, although a low take-off with a negative T in leads two and three and four is suggestive of pulmonary embolism.

Spontaneous pneumothorax can produce an identical pain involving the whole of both sides of the chest, and going down to both elbows. It is easily diagnosed, however, by physical examination. The hyperresonance on the affected side, with absent or amphoric breath sounds, is diagnostic.

The commonest pains that suggest cardiac infarction are those due to a root neuritis secondary to *spondylitis*. The difficulty arises chiefly in the first attack of pains of this nature, because when the pains have been repeated for months or years, their very frequency excludes the possibility of coronary occlusion.

The difficulty of the diagnosis of *dissecting aneurysm* is shown by the fact that it is usually discovered at autopsy. However, if one takes the blood pressure in all the limbs, listens over the abdominal aorta and iliac arteries for mur-

murs, and notes that the pains go too low to be of cardiac origin, even down the legs, the diagnosis can, at least frequently, be made.

The existing opinion that *gall stones* can cause angina, has very little support in fact. Angina occurs no more frequently in people with gall stones than in the general population. Gall stones or gall-bladder disease may produce pains under the sternum or in the region of the left breast that are suggestive of coronary occlusion (see above).

The majority of cases of *hiatus hernia* are symptomless. Those that have symptoms have them in relation to meals, or referred to the left shoulder (diaphragm pain). A few people however, with hiatus hernia have substernal pains, frequently brought on by effort, although not specifically so, as in angina. These pains may be relieved by nitroglycerine. Some of these people with a constant effort pain and hiatus hernia would require an autopsy to decide the cause of the pain.

A hiatus hernia also can cause substernal pains that are prolonged and resemble coronary occlusion. In such a case, fever would likely be absent and a series of electrocardiograms would show no change.

Rheumatic heart disease, especially mitral stenosis, often produces pains in attacks greatly resembling the picture of cardiac infarction. Two or three times a year, an elderly patient is admitted to Toronto General Hospital with acute pulmonary oedema, severe tightness in the chest, fever, congestive failure and some electrocardiographic changes, and a diagnosis is made of cardiac infarction. No murmurs are heard during the stay in hospital, but a few months later the patient returns to the Cardiac Clinic and is found to have mitral stenosis. Cases of rheumatic heart disease occasionally have bizarre pains which suggest coronary occlusion, which is uncommon in rheumatic heart disease. Only 2% of cases of rheumatic heart disease were found at autopsy to have coronary disease.

Emphysema of the mediastinum produces a substernal pain which is more steady and lasts longer than the pain of coronary occlusion. The pain has been known to last continuously, although gradually diminishing, for seventeen or eighteen days. This condition is diagnosed by hearing a shower of clicks, especially when the patient turns to the left side.

Rapid heart action frequently is wrongly considered to be evidence of heart disease, when it is entirely of nervous origin. The chief point to establish is whether the rapid heart action be constant or intermittent. One of the best aids in doing this is a basal metabolism test. The first day one sees the patient, the heart action may be continuously rapid, 110 to 140. Then when he returns for a basal metabolic rate the next day, the heart rate is found to be 76. The drop in the heart rate is almost as great a help as the basal metabolic rate itself. Tachycardia can occur following an infectious disease, such as diphtheria, scarlet fever, pneumonia, etc. However, the myocardial damage due to an acute infection is either fatal at the time or is completely recovered from. The tachycardia following an acute infection should not be made the basis for diagnosis of organic heart disease later in life. Tachycardia due to organic heart disease is constantly present, even during sleep. On the other hand, frequently following acute infections, children may run a slow heart rate, even below 50. This has no unfavourable significance.

TREATMENT

It is still a common mistake to fail to *digitalize* a patient with auricular fibrillation, and/or to keep him digitalized afterwards. It is not uncommon to see a patient who has been under treatment for an indefinite period, who is fibrillating with a rate of 130 or 140, and who never has had digitalis or has had inadequate doses. A doctor has been in my office several times during the last year, with auricular fibrillation; his heart rate has never been under 125 because he apparently was afraid to take the recommended doses of digitalis leaf. Another common error, which is widespread, both in England and America, is the failure to use digitalis in congestive failure in patients who are not fibrillating. This is based on the mistaken belief that digitalis is of no use except in fibrillation, and because digitalis often will not slow a normal rhythm. Various investigators have carefully compared the effect of digitalis on eliminating œdema in fibrillators and non-fibrillators, and have found no significant difference.

Digitalis should be given to everyone with congestive failure, excepting possibly a slow fibrillator whose ventricular rate is already too slow. The method of ordering the dosage

varies slightly in the two cases. For a fibrillator, one orders eight or ten grains a day until the heart action is slowed to between 80 and 90, and then a grain and a half a day or slightly more or less, as is required to keep the heart rate down to 90. In fibrillation, the heart rate is a pretty exact index of digitalization. This is lacking in a non-fibrillator. In these cases, one orders eight or ten grains a day for three days, to be followed by the maintenance dose of a grain and a half to two grains a day. In the non-fibrillator a total of twenty or thirty grains of digitalis leaf is given in two or three days because that is the amount one would estimate that would be needed to slow a fibrillator. It might be a better plan in a non-fibrillator, to order six to nine grains a day until nausea is felt. Then one would be more or less sure the patient was digitalized. In both, the maintenance dose should be continued indefinitely.

Digitalis should not be given subcutaneously. It should be used only by mouth or intravenously. It should not be used intramuscularly or subcutaneously because it is absorbed very irregularly and produces a great deal of local irritation.

Digitalis is never used to slow a tachycardia due to nervousness, fever or hyperthyroidism.

There appears to be a fear of giving adequate doses of *aminophyllin* intravenously. Three and three-quarter grains intravenously, night and morning will frequently abolish nocturnal dyspnoea, Cheyne-Stokes' breathing, or any form of orthopnoea, including acute pulmonary œdema. In fifteen-grain doses intravenously, it is one of the most effective diuretics, and should be tried when other remedies have failed in asthma. A fourth use is for unconsciousness. A dose of even three and three-quarter grains intravenously will frequently cause a return of consciousness in a patient, no matter what the cause has been.

Patients with *congestive failure* are frequently not put to bed at all for months, or are let up too soon. All patients with congestive failure should be kept at rest in bed until all signs of failure have disappeared, and then from two to four weeks longer. Regulation of their after-life to keep them free of failure is just as important as it is to get them rid of œdema. The number of hours out of bed during the twenty-four, and, after congestive failure, the amount of activity, which can be borne without a return of œdema or passive congestion of the

liver or lungs, has to be found out by careful observation.

In the treatment of *coronary occlusion*, many doctors fail to relieve the *pain* as rapidly as they might. Patients are allowed to go with varying degrees of pain for several hours or a day or more. A quarter grain of morphine should be given every half hour by hypodermic until the pain is relieved. If there be no relief after two doses, try a twelfth to a sixteenth grain of morphine intravenously. Another drug which should be tried in such cases is one of the intravenous barbiturates, such as sodium amytal or pentothal or luminal, three to five grains.

Theoretically, at the commencement of coronary occlusion, half a grain of papaverine intravenously, every three hours, should be beneficial. It relaxes smooth muscle fibres, while morphine contracts them, so that if there be general coronary spasm when a large branch is suddenly occluded, papaverine might increase coronary flow.

Some patients with coronary occlusion are kept in bed much too long. There is no point in keeping a patient in bed with cardiac infarction longer than six weeks, unless he is too ill to get up, on account of some complication, such as congestive failure.

Perhaps the commonest mistake of all in treating people with coronary occlusion is to restrict their activity too much after they have recovered. Their rule for exercise in their after-life is any exertion which is comfortable is all right, and advisable. It is not physical work which brings on a new attack of coronary occlusion. A new attack is entirely due to new coronary atherosclerosis, or some complication thereof, such as a hæmorrhage into an atheromatous plaque.

In the treatment of *venous thrombosis*, patients are frequently kept too quiet, especially after they have had a pulmonary embolus. The swollen limb should be elevated, and the patient should be encouraged to move all the joints of the affected limb, several times a day, in order to hasten venous flow and prevent new thrombus formation. A new pulmonary embolus is the result of fresh thrombosis. Keeping the patient and the limb absolutely quiet favours the formation of a new thrombus. If the swollen limb be bandaged, the pressure must be even, not tighter in one spot than another.

Tea and *coffee* are frequently forbidden cardiac cases, or people with high blood pressure, without the slightest justification. The only harm tea or coffee could do anyone would be to keep them awake.

We should avoid making *sloppy diagnoses*, such as "a tired" heart, "a flabby" heart, "an irritable" heart, or telling patients they have a murmur or a leakage, without adequate explanation. A functional pulmonary systolic murmur to a patient means exactly the same as a mitral diastolic. In treating cardiac patients the old advice of encouragement and reassurance is extremely important, and one should be careful to avoid making discouraging remarks. For example, a patient with a neuritic pain on the left side of the chest, secondary to spondylitis, asked the doctor if it would do her heart any harm. He replied, "No, not if you are careful".

In summary, let us say that where we fail in the diagnosis and treatment of heart disease is when we fail to apply accurate thinking to the facts which we all do or could know.

That music in war factories is most useful in the case of workers in repetitive jobs which are largely automatic is a conclusion drawn from the opinion of works managements who make use of the B.B.C. industrial broadcasts from 10.30 to 11 and 3 to 3.30 daily. For skilled workers with more interesting jobs music can be a help provided it is not too obtrusive, but for office and executive staff it is definitely ruled out as a nuisance and a hindrance. Vocal music and "jazz" are not suitable as they tend to take attention from the

work in hand; dance music, light opera, musical comedy, and well-known marches and intermezzi, are well liked; and it is an advantage to have familiar music, not harm, but good, being done if the workers join in singing or whistling. Since the music should not excite a spirit of activity but act as a refreshment and mental tonic it should not be an incessant accompaniment of work, but should rather be utilized at times when work has a tendency to drag, as is not infrequently the case towards the end of the afternoon.—*J. Roy Inst. of Pub. Health & Hyg.*, 1942, 5: 143.

THE ELECTRIC SHOCK THERAPY OF PSYCHOSIS

BY GEORGE E. REED

Montreal

A BRIEF consideration of the present more hopeful outlook for certain types of mental patients appears timely. This is so because now we have a method of treatment that will shorten periods of illness, thereby increasing the efficiency of the civilian and military population and at the same time lighten the increasing case load of the general practitioner and the psychiatrist.

The technique, indications, contraindications and complications of electric shock therapy are important details that are changing, but they are quite clear and are readily available in the literature. In brief, the treatment consists of stimulating the cerebral cortex by passing a carefully controlled and timed electric current through the patient's head by placing suitable electrodes on each side of the forehead. The 60-cycle alternating current used is of less than one ampère strength and varies from 60 to 150 volts, the current flowing for a set period of from 0.1 to 0.25 seconds. By such methods of cortical stimulation the operator produces an epileptiform seizure as often as desired, but can produce unconsciousness alone without a seizure at will and also certain effects. The patient recovers within a few hours and suffers no pain or discomfort with the procedure.

To actually apply and give the treatment is simple; however, the selection of cases and the necessary individual variations in the management of each case requires considerable psychiatric experience, since temporary mental defects produced by the treatment must be distinguished from the newly exposed symptoms of the primary psychosis. The treatment has been carried out as an office and outpatient procedure but hospitalization is recommended in most cases. These data are familiar to all psychiatrists, who may be interested, however, in the results as reported here. The general practitioner should know the types of cases that will respond to such treatment, and we will therefore consider this point by comparing the prognosis with and without electric shock treatment in those types of cases that respond well.

The manic depressive psychosis is not an uncommon recurring disease affecting otherwise

normal people. Some cases are subject to recurrent attacks of depression, others suffer only from the manic, excitable phase of the disorder while some are subject to both extremes, sometimes alternating with or without normal periods between the manic and depressed states.

This disease, manic depressive psychosis, usually manifests itself by a first attack before 35 years of age. I would call your attention to the fact that the depression or excitement may vary in degree from very mild symptoms to the most profound depression or extreme euphoric excitement. The duration of each attack is seldom less than several months and may extend over several years. The well periods between attacks may also cover periods of weeks or years. Generally speaking, the first attacks are shorter but the most severe, while the relapses in later years last longer and the periods of remission tend to become shorter. During these months of emotional depression there is danger of suicide, undernourishment, and severe infections. During the prolonged excited periods exhaustion with myocardial failure and accidents due to overactivity and poor judgment are constant threats. Each attack is dreaded beforehand by the patient as well as his or her relatives, employers, employees and in some cases, physician. This type of case responds well to electrical shock therapy which reduces the period of illness to a few weeks and encourages the patient to return immediately for treatment when the next attack occurs.

Involutional melancholia is usually considered to include several types of depression and anxiety which appear for the first time in extreme degrees in women between the ages of 40 to 55 years and in men from 45 to 60. It has long been thought that this disorder, involutional melancholia, was dependent upon changes in the endocrines. However, endocrine assays and therapeutic trials have not yet confirmed this assumption.

Until now only 50% of cases of involutional melancholia have responded to various forms of treatment and in the case of the 50% who do recover the duration of the attack averages 2½ years. This disorder has responded so quickly,

TABLE II.

Diagnosis	Recovered	Improved	Unimproved	Totals
Manic depressive psychosis manic phase.....	7	2	0	9
Manic depressive psychosis depressed phase..	9	9	3	21
Involuntal depression.....	17	3	*1	21
Reactive depression.....	5	0	†1	6
Totals.....	38	14	5	57

*Fracture of humerus.

†Fracture of femur.

Table II and Charts 1, 2, and 3 illustrate the excellent results that may be expected in acute, chronic and recurrent types of emotional depression or excitement as seen in manic depressive and involuntal psychosis.

Table III may be taken as a control, the first group (A) illustrating the uselessness of treatment unless experienced selection of cases is made, while group B demonstrates that the method is of value for some of the extreme problem cases seen in mental hospitals.

TABLE III.

Diagnosis	Recovered	Improved	Unimproved	Totals
(A)				
Dementia præcox.	0	4	10	14
Anxiety neuroses.	0	0	5	5
Pre-senile.....	0	1	1	2
Hypothyroid (depressed)....	1	0	0	1
Psychopath.....	0	0	1	1
Arrested general paresis.....	0	1	3	4
Not diagnosed...	0	0	2	2
Totals.....	1	6	22	29
(B)				
Dementia præcox.	1	3	*3	7
Anxiety neuroses.	1	0	1	2
Hysteria.....	0	1	0	1
Epilepsy (depressed)....	0	1	0	1
Senile (depressed)	0	1	0	1
Feeble minded (depressed)....	0	1	0	1
Cerebral arteriosclerosis.....	0	0	1	1
Totals.....	2	7	5	14
A+B Totals...	3	13	27	43

*1 case fracture of humerus.

Relapses after treatment usually respond to a second and shorter course of treatment and some cases not immediately recovered but listed as improved continue to full remission. Table IV lists the relapses as well as *later recoveries*

in the first fifty cases completed and reported as in Table II, six months ago.

TABLE IV.
RELAPSES AND DELAYED RECOVERIES
(SINCE SEPTEMBER 1, 1941)

Diagnosis	Original report	Present status
Manic depressive: (a) depressed.....	1 recovered 6 improved 1 unimproved	1 relapsed 6 recovered 1 recovered
(b) manic.....	1 recovered	1 relapsed
Involuntal melancholia.....	2 improved 5 recovered	1 recovered 1 relapsed
Total.....	16	16

Relapsed = 8

Late recoveries = 8

The following notes might be of interest in considering the *contraindications* and the *possibilities* with clinical problems.

1. Electric shock therapy causing convulsions will cause an exacerbation of any active infection present. For example, patients with a fever, a dental abscess or with skin infections are not treated. Yet a patient of ours just discharged from a sanatorium with arrested tuberculosis was cured of involuntal melancholia.

2. Hypertension and coronary disease is a contraindication to treatment, yet we have treated one case with active coronary disease, and a case of auricular fibrillation has been successfully treated. We have also treated two patients over 70 years of age with moderate hypertension and arteriosclerosis.

3. We have treated unsuccessfully, but without complications, one depressed case of hemiplegia due to cerebral thrombosis.

4. Patients who are receiving foreign protein therapy such as anti-typhoid vaccine, will collapse if exposed to electric shock therapy.

5. Epileptiform convulsions may produce compression fractures of the spine, shoulder, neck of the femur and such muscular action may also produce a fracture of the scapula.

6. Some types of convulsion will sometimes produce a lung abscess without demonstrable foreign body inhalation (metrazol).

7. Intestinal obstruction due to volvulus, intussusception or herniation may sometimes result from cerebral stimulation. This may be a pressure effect or related to stimulation of peristalsis or both.

Complications in this series of 100 cases have been much less than with some other types of

convulsive shock therapy. In the course of treating the first group of 50 patients we had two cases of fracture of the head of the humerus and one case of fracture of the neck of the femur. We have had no fractures since then, but traumatism to an arthritic shoulder caused some pain in one case. One patient developed an internal hernia, recovering with operation. One patient developed sinusitis, one thrombophlebitis, and one bronchopneumonia. Three patients developed acute panic reactions, one recovered and was well, while the other two are definitely worse mentally but not suffering from any signs of organic brain disease. There have been no deaths associated with the treatment or in any of these cases.

The author wishes to thank Dr. C. A. Porteous, Medical Superintendent, Verdun Protestant Hospital, for his help and advice in publishing this report, which was

read at the Montreal Medico-Chirurgical Society, March 20, 1942.

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RÉSUMÉ

La psychose maniaco-dépressive et la mélancolie d'invololution peuvent être écourtées par la thérapie du choc électrique. Par cette méthode, le cortex est stimulé par un courant parfaitement dosé et chronométré. Il s'ensuit une courte perte de la conscience accompagné ou non de convulsions. Dans la démente précoce on n'obtient pas de guérison mais un certain contrôle des accidents aigus. Dans tous les cas les rechutes ne sont pas évitées, mais elles sont traitables de la même façon. Les chocs sont donnés en moyenne 3 fois par semaine jusqu'à concurrence de 20 environ. On ne doit pas traiter les cas d'infection active, les hypertendus, les cardiaques et ceux qui reçoivent en même temps des chocs protéiniques. Les complications sont rares et consistent surtout en fractures; plus rarement encore on peut observer des hernies internes. Le taux de mortalité est nul.

JEAN SAUCIER

SOME OBSERVATIONS ON EAR, NOSE AND THROAT DISABILITIES ASSOCIATED WITH AVIATION*

By R. S. PENTECOST, F.R.C.S.(C)

Toronto

IN 1940 a young man with mastoiditis was admitted for operation to Christie Street Hospital, Toronto. A few days later a second young man with mastoiditis was admitted, and within a week, a third. These young men were trainees under the British Commonwealth Air Training Plan and were referred from the same Initial Training School. All gave the same history. No previous ear trouble; present condition began as a severe earache just prior to emerging from a decompression chamber in which they had been placed to accustom them to rapid changes in atmospheric pressure. On close questioning all admitted that prior to entering the decompression chamber they had a head cold but failed to mention this to the officer in charge.

Information concerning these cases was of course sent to the Principal Medical Officer of the district, and I am happy to report that no other cases of mastoiditis have come from this school.

These cases illustrate the point that pilots should not be permitted to fly when they have an acutely inflamed nose and naso-pharynx. If the exigencies of service demand that they take

their planes aloft then they should be provided with an astringent nasal solution or salve for use during the forced flight. Isotonic ephedrine (1%) is the best for this purpose, as it not only acts as an astringent but increases ciliary action and promotes drainage of the congested mucosal areas.

It has been said that the magnitude of the ear problem in aviation may be judged from the fact that pilots suffer more frequently from occupational disturbances of this organ than from all other occupational diseases combined.¹

My interest in aviation medicine began during the war of 1914-1918 when, as an officer of the Canadian Army Medical Corps overseas, I was called upon to examine candidates for the Royal Flying Corps, now the R.A.F. The examination of the ear, nose and throat then included the Barany tests for vestibular function, but otherwise was of rather a superficial nature. Unless a man had some definite pathological condition he was usually passed. However, although I have been called upon during the past twenty years to treat a number of ex-members of the R.F.C., I have found only a few whose disability could be attributed to flying *per se*.

* Read before the Section of Otolaryngology, Academy of Medicine, Toronto, March 16, 1942.

During 1940, 1941, and 1942 several hundred members of the Royal Canadian Air Force, the Royal Air Force, and the Royal Norwegian Air Force have been referred to the ear, nose and throat service at Christie Street Hospital for treatment. Some of these were experienced pilots and air observers from fighter, reconnaissance and bomber squadrons, invalided home or sent to Canada for instructional purposes, but the majority were trainees from Manning Depots, Initial Training Schools, Service Flying Schools, Air Armament, Wireless, Bombing and Navigation Schools. The majority were young men between 20 and 30 years of age. All had had a particularly rigorous physical and mental examination and had passed their medical boards in category A. All were keen, intelligent men, anxious to get on with their job,—the "cream of the crop" of young Canadian and English manhood. Time does not permit an analysis of the case reports of these men, nor do I think any useful purpose would be served by such a procedure. It might, however, be of some value to refer to certain types of disease which were directly due to the flying activities of these patients.

In order to correctly evaluate the history and clinical findings in such cases one must be familiar with certain aspects of modern aviation, so I trust you will bear with me while I briefly refer to these.

In the war of 1914-1918 the familiar Camels, Curtiss and Fokkers seldom exceeded 100 miles per hour, and as they were chiefly used for reconnaissance and as "spotters" for the artillery, seldom flew higher than 10,000 feet. Dive bombing was unknown. Aerobatics or aerobatics was considered "stunt flying" and discouraged. Many planes crashed, but as the pilots were not provided with parachutes few lived long enough to give any information as to the symptoms which caused them to lose control of their planes.

While there may be little difference in the pilot of 1914 and 1942, the difference in the machines is phenomenal. A modern fighter plane—Hurricane, Airacobra, or Whirlwind—leaves the ground at 150 miles an hour, accelerates to 400 to 450 miles per hour, and climbs almost vertically 5,000, 10,000 or 20,000 feet within a few minutes. A modern bomber—Halifax, Stirling, or Flying Fortress—with high octane gas and turbo supercharger, may easily reach a height of 35,000 feet where the

temperature is -54.3° C. and the atmospheric pressure 178 mm. Hg.

What about the descent? All military authorities are agreed that air superiority has been the deciding factor in every military success in the present war, and that the dive bomber and dive torpedo plane have wrought terrible havoc on their adversaries. Authoritative sources inform us that in the battles of France, Crete, Taranto and Malaya, the pilots approached their targets at from 10,000 to 12,000 feet and then dropped like a plummet to within a few hundred yards of the earth or sea before releasing their bombs or "tin fish". The atmospheric pressure at 10,000 feet is approximately 522 mm. of Hg. so that in such a dive the pilot is subjected within a few seconds to a difference of pressure of 240 mm. of Hg.

How does such a sudden increase in atmospheric pressure affect the ear, nose and throat?

The Eustachian tube is normally closed. By means of the salpingopharyngeus, the tensor veli palatini and the levator veli palatini, it opens by a flutter valve action during swallowing, yawning and other physiological acts and serves to keep a constant pressure within the tympanum and naso-pharynx. If this relationship is disturbed, discomfort or actual pain results.

During rapid ascent with its decreased pressure, the flutter valve action of the tube usually permits the air to escape from the middle ear with little discomfort to the subject other than an occasional "click". During rapid descent the opposite is true and it sometimes requires considerable voluntary effort on the part of the subject to open the tube. If the latter cannot be opened, or if it opens and then closes tight, infected secretion from the naso-pharynx may enter the tympanum and produce an inflammatory otitis media.

Armstrong¹ and Heim² called particular attention to this in 1937, and called it *aero-otitis media*.² We have seen a number of cases of *aero-otitis media*, and for the purpose of this discussion have divided them into four types.

Type I.—The subject is aware, after rapid descent, of a sense of fullness in one or both ears, associated with slight tinnitus and impairment of hearing. Objective examination reveals the affected membrana tympani to be slightly retracted, with injection of the blood vessels along the handle of the malleus. Hearing impaired about 10 decibels.

Type II.—Sudden earache of a throbbing character associated with tinnitus, slight vertigo, and moderate impairment of hearing, from 20 to 30 decibels for medium tones. Examination reveals the membrana tympani to be pink throughout and markedly retracted, or slightly bulging in the posterior portion.

Type III.—Continuous severe throbbing earache; hearing impaired from 40 to 50 decibels. Examination shows the aural canal to contain a moderate amount of sero-sanguineous pus, which on removal reveals a pulsating bulging fundus, complete loss of the normal landmarks, with a small perforation usually involving the anterior inferior quadrant. There may or may not be mastoid tip and antral tenderness on pressure.

Type IV.—Sudden severe shooting pain in the ear after long rapid descent, described by one patient "as if a red hot darning needle had been thrust into the ear". Marked deafness and vertigo followed by vomiting, pallor and other signs of shock. Examination shows the aural canal to contain some sero-sanguineous exudate or blood clot, which on removal reveals one or more ragged perforations of the drum. The latter is injected throughout and may be slightly bulging. Clinically, this latter type resembles very closely traumatic perforations we observed during the war of 1914-1918, which were due to concussion from high explosive shells or bombs.

AERO-SINUSITIS

It has been pointed out by Regnarth⁸ and by Vail⁹ that workers in compressed air are particularly disposed to disorders of the upper respiratory tract and of the ear; in fact, a study of these disorders shows that clinically they differ little from those observed in aviators. May I remind you that the paranasal or accessory sinuses are lined with mucosa contiguous with the nasal mucosa and normally communicate freely with the nasal passages. Any increase or decrease in atmospheric pressure in the nose would automatically cause air to enter or leave the sinuses, and any interference with this free interchange of air would likewise interfere with the drainage of a sinus. If the pressure within a sinus differs in any marked degree from that in the nose, definite discomfort or pain results. If, like the Eustachian tube, the ostium or duct of a sinus suddenly opens to permit the entering of air and, with it, pyogenic organisms, and then closes tightly

again, we have a potential suppurative sinusitis. This condition, in our experience, is not uncommon among aviators, and as the etiology is the same as aero-otitis media, we have taken the liberty of designating it aero-sinusitis. Like aero-otitis we recognize several stages or types. All the cases we have seen have been unilateral.

Type I.—History of sudden severe sharp supra-orbital pain noticed after rapid ascent or descent of several thousand feet and persisting from six to twenty-four hours after landing. Examination within a few hours of onset reveals a swollen reddened glistening middle turbinate on the affected side, but no pus. Stereoscopic x-ray of the paranasal sinuses, taken in the lateral, anteroposterior and axial planes, show all the sinuses to be well outlined and clear.

Type II.—Persistent supraorbital pain, as in Type I, for 48 hours. Examination reveals the same objective findings as in Type I, but usually some abnormal secretion is seen in the middle meatus. The stereoscopic x-ray reveals definite swelling of the lining mucosa of the frontal sinus, anterior ethmoid and maxillary antrum.

Type III.—History of recurring attacks of severe supra- and peri-orbital pain noticed during and after a flight. Examination shows the same objective findings as in Type II, except that the secretion is definitely purulent and there is definite engorgement and swelling of both the middle and inferior turbinates on the affected side. X-ray shows a slight to moderate haziness of the whole of the frontal, ethmoid and maxillary sinuses on the same side.

TREATMENT

The treatment of acute aero-otitis media and acute aero-sinusitis is, broadly speaking, the same, i.e., to restore with the least possible trauma the normal ventilation of the parts involved. In Types I and II aero-otitis media it is our custom to spray the affected side of the nasopharynx through the nostril with a solution of equal parts of 1% pontocaine and 1-2,000 adrenalin solution. This serves to shrink the swollen mucosa, remove any abnormal secretion from the nose and naso-pharynx, and to give sufficient local anaesthesia to enable the second step to be carried out five minutes later without discomfort to the patient.

Insert the tip of an Eustachian catheter into the opening of the affected Eustachian tube and by means of an attached rubber bulb gently

inflate. We use a special vaporizer attachment containing benzedrine, so that the air entering the middle ear contains benzedrine vapour. The patient usually gets immediate relief from his symptoms and the tube remains open for twenty-four hours or longer. If necessary, treatment may be repeated at twenty-four hour intervals for several days. In advanced aero-otitis media with purulent aural discharge we prescribe hot irrigations of boric acid solution of the aural canal q.2 h., and give sulfathiazole, gr. xxx, followed by gr. xv. q.4 h. until the acute phase has passed. If mastoiditis develops mastoidectomy may, of course, be necessary.

In acute traumatic perforation of the ear drum we have found morphia necessary as a sedative. The blood clot is removed from the aural canal with a dry swab, and sodium sulfathiazole powder is insufflated until the drum is covered. The auditory meatus is plugged with absorbent cotton. The introduction of any fluid, or so-called analgesic drops, into the canal is contraindicated. It invariably is followed by infection of the middle ear and in our experience serves no useful purpose. The majority of cases of traumatic perforated ear drums due to sudden excessive increase in air pressure (aviation, bomb or shell) will heal up entirely within three weeks if after the above preliminary treatment the ear is left strictly alone. The vertigo, nausea, pain, etc., usually clear up within forty-eight hours if the patient is kept at rest with sedatives.

The treatment of Type I aero-sinusitis consists in placing the subject on a barrack room table or bench in the supine position with his head hanging over the edge. Insert 15 minims of equal parts of 1% pontocaine and 2% isotonic ephedrine solution into the affected nostril, and maintain the head in position for three minutes or until the patient is conscious of a definite "click" in the ethmoid region. The click corresponds to the opening of the nasofrontal duct and should be followed by immediate relief of symptoms.

If symptoms persist in spite of this treatment insert a trochar and cannula under the inferior turbinate into the antrum and lavage with boric acid solution. This serves not only to remove any inflammatory products from the antrum itself but also, through suction, from the nasofrontal duct and ethmoid cells. If free pus is present it is our custom to introduce into the affected antrum through the cannula

3 c.c. of 20% sodium sulfathiazole solution. The latter in our experience shortens the recovery time by at least 50%.

We have never found it necessary to operate, to relieve the acute phase of aero-sinusitis.

Let me add a few words regarding the prevention of aero-otitis media and aero-sinusitis. We have not yet seen a patient in whom careful examination did not reveal one or more predisposing factors. In order of frequency we would list these as follows.

Aero-otitis media.—(1) Masses of infected lymphoid tissue adjacent to the ostium of the Eustachian tube (Gerlach's tonsil). (2) Polypoid enlargement of the posterior tip of the inferior turbinate pressing against the tube. (3) Chronic congestion of the mucosa adjacent to the tube due to interference of ventilation by a vomerine spur. The latter often causes almost complete blocking of the posterior portion of the inferior meatus of the nose on one side. (4) Nasal polypi in the posterior nares and nasopharynx.

Aero-sinusitis.—(1) Deviation of the mesoethmoid portion of the nasal septum pressing the middle turbinate tight against the external wall and partially closing the infundibulum. (2) Cystic or polypoid enlargement of the anterior portion of the middle turbinate.

It is probable that the majority (at least 75%) of the youth of Canada have a nasal septum deviated to some degree. To disqualify every candidate with a deviated septum from the air force is of course ridiculous. It is only those whose septum is definitely interfering with proper nasal ventilation who should be disqualified for aircrew until such interference is surgically corrected.

It would appear reasonable to conclude that the prevention of aero-otitis media and aero-sinusitis is possible if the predisposing factors mentioned above are removed by surgical or other means before the trainee is permitted to engage in aerobatics or dive bombing practice.

AIR SICKNESS

Air-sickness, like sea-sickness, is characterized by vertigo, followed by nausea, vomiting, sweating, prostration and a feeling of apprehension. Wodack⁷ states that extensive research by Russian and German investigators has shown that proprioceptive sensibility (*Tiefensensibilität*) is much more important in maintaining orientation than the mechanism of equilibrium in the

inner ear. In pilots of long standing a physiological hypoexcitability develops and is a sign that they are getting accustomed to their profession. Similar findings have been noted in acrobats and dancers. Most of the air crew, like most sailors, learn to overcome the symptoms of air-sickness. In the few cases we have seen which have been permanently grounded because of persistent air-sickness and have had a complete neuro-otological examination, it was found that the vestibular tracts were hypersensitive. However, these patients also showed definite evidence of emotional instability. The latter would appear to be the most important factor in the production of air-sickness.

CHRONIC AVIATION DEAFNESS

Firestone,⁴ Bunch,⁵ Dalziel Dickson and Ewing,⁶ have called attention to the frequency of chronic deafness among pilots with several years' flying experience. They have also referred to the effect of both chronic acro-otitis and the noise and vibration of the propeller on the ear. Up to the present we have had no cases of this nature but no doubt this will be one of the post-war pension problems with which we will have to deal. In the meantime it is our conviction that much can be done to prevent such deafness by early diagnosis and appropriate treatment.

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RÉSUMÉ

Les sujets dont les muqueuses naso-pharyngées sont congestionnées ne doivent pas voler: ils peuvent dans cet état déclencher des troubles auriculaires sérieux allant jusqu'à la mastoïdite. En cas d'urgence de vol, il faut utiliser préventivement l'éphédrine à 1% localement. Les brusques changements de la pression atmosphérique amènent au cours des plongées rapides des troubles auriculaires caractérisés par des hémorragies et de la surdité allant parfois jusqu'au syndrome de shock. L'aéro-sinusite reconnaît les mêmes mécanismes et s'exprime par de la congestion des muqueuses et des douleurs. Le traitement des deux états consiste à rétablir la perméabilité aérienne des cavités affectées et à en faire la désinfection au cas d'écoulements purulents. Le sulfathiazole est l'antiseptique utilisé. La prophylaxie sera bien faite si on débarrasse les sujets des excroissances osseuses ou lymphoïdes du voisinage et si on corrige les déviations cartilagineuses. Le mal de l'air serait attribuable à l'instabilité émotionnelle. La surdité chronique des aviateurs est mal connue mais il semble qu'il soit possible dès maintenant d'en réaliser la prophylaxie.

JEAN SAUCIER

MEDICAL ASPECTS OF AIRCREW SELECTION*

BY WING COMMANDER F. A. L. MATHEWSON

R.C.A.F. Medical Service, Ottawa

THE medical service of the Royal Canadian Air Force is responsible for the physical and psychological health of aircrew personnel. Airmen are subject to the same illnesses that are met with in civilian practice, but in addition face stresses and strains that are directly related to their occupation. The physiological effects of altitude, the responses to acceleration, cold, glare, fatigue and the constant risk of flying, all produce reactions in the individual that may cause a deterioration in efficiency. To assure the highest standards of performance, candidates must be chosen who show the greatest

promise of being maintained at a high level of efficiency under conditions of operational flying. The most carefully picked group of men may eventually be eliminated if they are not given protection from the hazards of their occupation. This entails a thorough understanding of the physiology of flight and the practical application of its principles in terms of aircraft design, oxygen equipment, protective flying clothing, etc. Aviation medicine may be divided into the two broad categories of selection and maintenance. While the medical aspects of selection are to be discussed in this paper, it must be emphasized that successful selection and proper maintenance are equally dependent on each other.

*Read at the Seventy-third Annual Meeting of the Canadian Medical Association, Jasper Park, Alta., June 18, 1942.

In peace time, an individual wishing to learn to fly had first to pass the medical examination set by the Department of Civil Aviation. Having satisfied this standard, he was permitted at his own expense to take flying lessons from an approved flying instructor. Whether he ever reached the degree of skill required for a private pilot's licence depended on three things: his ability, his determination, and his pocketbook. There was no time limit. If he decided to make flying his life work, he was required to reach the higher levels of proficiency and physical fitness demanded for commercial and transport licences. It can be seen that under this system the only essential standard before flying training could be undertaken was the medical standard, the responsibility for successful training remaining solely with the individual.

Military flying training before the war in Canada was conducted by the Royal Canadian Air Force, and included candidates taken into the R.C.A.F. proper, and the part-time training of civilians in the non-permanent Auxiliary Active Air Force. Before being considered for the A.A.A.F. the applicant was required to have at least his private pilot's licence, which meant that he was physically fit and had acquired a certain degree of flying ability. The permanent R.C.A.F. undertook the selection and complete training of its personnel. They restricted their program, however, to creating a nucleus of men with outstanding intellectual and physical qualifications who would form the framework on which to build a large air force should the need arise. This problem, comparatively speaking, was not a difficult one, as those wishing to make military flying their life work far outnumbered the positions available. The success of this program is now fully realized by all. The selection of candidates for service flying under conditions of national emergency is not to be confused with the procedures above described.

In 1939 the knowledge of mass aircrew selection was based on experience gained in the last war. In this respect it is to be remembered that it was not until 1917 that the Royal Naval Air Service and the Royal Flying Corps began their rapid expansion, and selection became a practical consideration. Medical standards were devised largely on an arbitrary basis, and modifications were introduced from time to time as newer knowledge of the physiology of flight indicated. Many complex problems were en-

countered, the answers to which were only partially solved when the war came to an end. During the hiatus between the last war and the present conflict, aviation engineering made great strides, but investigations in aviation medicine were restricted to the efforts of isolated workers, and it was only when the present war became imminent that a concentrated effort was made to solve the physiological and psychological problems of flying. Knowledge of these matters has developed at a great pace and the practice of aviation medicine has undoubtedly become a medical specialty. Medical officers are given special instruction at the School of Aviation Medicine, and it has been necessary to provide refresher courses from time to time to keep them abreast with recent developments.

The success of any program of personnel selection depends to a great extent on a comprehensive investigation of the characteristics of the job that is to be undertaken. From an appreciation of these factors standards of ability and physical fitness can be established, which, if fulfilled, offer the greatest probability of success. A service aircraft, like a warship or tank, is designed primarily to inflict losses upon the enemy. Its ability to strike blows of maximum efficiency, maintained over a prolonged period of time in an environment which produces severe physiological and psychological stresses, depends upon the skill and endurance of the personnel who operate it. While the ultimate purpose of military flying is aerial warfare, it must of necessity be preceded by a period of intensive training.

The training picture likens itself in many ways to a hurdle race. There are a collection of varied obstacles which must be overcome before success can be achieved. If they are scattered throughout the length of the course it will only be at the completion of the race that the number of successful candidates can be determined. If these obstacles, or in the case of airmen, levels of achievement, could be accurately assessed at the beginning, it would be possible to apply testing procedures by means of which a large proportion of eventual failures could be eliminated. It has been estimated that it costs approximately \$22,000 to train a pilot. The training of men who will ultimately prove unsuccessful is not only wasteful from a monetary standpoint, but means the loss of valuable training hours that could have been devoted to others offering greater prospects of success. It is

inner ear. In pilots of long standing a physiological hypoexcitability develops and is a sign that they are getting accustomed to their profession. Similar findings have been noted in acrobats and dancers. Most of the air crew, like most sailors, learn to overcome the symptoms of air-sickness. In the few cases we have seen which have been permanently grounded because of persistent air-sickness and have had a complete neuro-otological examination, it was found that the vestibular tracts were hypersensitive. However, these patients also showed definite evidence of emotional instability. The latter would appear to be the most important factor in the production of air-sickness.

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BY WING COMMANDER F. A. L. MATHEWSON

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THE medical service of the Royal Canadian Air Force is responsible for the physical and psychological health of aircrew personnel. Airmen are subject to the same illnesses that are met with in civilian practice, but in addition face stresses and strains that are directly related to their occupation. The physiological effects of altitude, the responses to acceleration, cold, glare, fatigue and the constant risk of flying, all produce reactions in the individual that may cause a deterioration in efficiency. To assure the highest standards of performance, candidates must be chosen who show the greatest

promise of being maintained at a high level of efficiency under conditions of operational flying. The most carefully picked group of men may eventually be eliminated if they are not given protection from the hazards of their occupation. This entails a thorough understanding of the physiology of flight and the practical application of its principles in terms of aircraft design, oxygen equipment, protective flying clothing, etc. Aviation medicine may be divided into the two broad categories of selection and maintenance. While the medical aspects of selection are to be discussed in this paper, it must be emphasized that successful selection and proper maintenance are equally dependent on each other.

*Read at the Seventy-third Annual Meeting of the Canadian Medical Association, Jasper Park, Alta., June 18, 1942.

In peace time, an individual wishing to learn to fly had first to pass the medical examination set by the Department of Civil Aviation. Having satisfied this standard, he was permitted at his own expense to take flying lessons from an approved flying instructor. Whether he ever reached the degree of skill required for a private pilot's licence depended on three things: his ability, his determination, and his pocketbook. There was no time limit. If he decided to make flying his life work, he was required to reach the higher levels of proficiency and physical fitness demanded for commercial and transport licences. It can be seen that under this system the only essential standard before flying training could be undertaken was the medical standard, the responsibility for successful training remaining solely with the individual.

Military flying training before the war in Canada was conducted by the Royal Canadian Air Force, and included candidates taken into the R.C.A.F. proper, and the part-time training of civilians in the non-permanent Auxiliary Active Air Force. Before being considered for the A.A.A.F. the applicant was required to have at least his private pilot's licence, which meant that he was physically fit and had acquired a certain degree of flying ability. The permanent R.C.A.F. undertook the selection and complete training of its personnel. They restricted their program, however, to creating a nucleus of men with outstanding intellectual and physical qualifications who would form the framework on which to build a large air force should the need arise. This problem, comparatively speaking, was not a difficult one, as those wishing to make military flying their life work far outnumbered the positions available. The success of this program is now fully realized by all. The selection of candidates for service flying under conditions of national emergency is not to be confused with the procedures above described.

In 1939 the knowledge of mass aircrew selection was based on experience gained in the last war. In this respect it is to be remembered that it was not until 1917 that the Royal Naval Air Service and the Royal Flying Corps began their rapid expansion, and selection became a practical consideration. Medical standards were devised largely on an arbitrary basis, and modifications were introduced from time to time as newer knowledge of the physiology of flight indicated. Many complex problems were en-

countered, the answers to which were only partially solved when the war came to an end. During the hiatus between the last war and the present conflict, aviation engineering made great strides, but investigations in aviation medicine were restricted to the efforts of isolated workers, and it was only when the present war became imminent that a concentrated effort was made to solve the physiological and psychological problems of flying. Knowledge of these matters has developed at a great pace and the practice of aviation medicine has undoubtedly become a medical specialty. Medical officers are given special instruction at the School of Aviation Medicine, and it has been necessary to provide refresher courses from time to time to keep them abreast with recent developments.

The success of any program of personnel selection depends to a great extent on a comprehensive investigation of the characteristics of the job that is to be undertaken. From an appreciation of these factors standards of ability and physical fitness can be established, which, if fulfilled, offer the greatest probability of success. A service aircraft, like a warship or tank, is designed primarily to inflict losses upon the enemy. Its ability to strike blows of maximum efficiency, maintained over a prolonged period of time in an environment which produces severe physiological and psychological stresses, depends upon the skill and endurance of the personnel who operate it. While the ultimate purpose of military flying is aerial warfare, it must of necessity be preceded by a period of intensive training.

The training picture likens itself in many ways to a hurdle race. There are a collection of varied obstacles which must be overcome before success can be achieved. If they are scattered throughout the length of the course it will only be at the completion of the race that the number of successful candidates can be determined. If these obstacles, or in the case of airmen, levels of achievement, could be accurately assessed at the beginning, it would be possible to apply testing procedures by means of which a large proportion of eventual failures could be eliminated. It has been estimated that it costs approximately \$22,000 to train a pilot. The training of men who will ultimately prove unsuccessful is not only wasteful from a monetary standpoint, but means the loss of valuable training hours that could have been devoted to others offering greater prospects of success. It is

logical, therefore, to establish wastage, as early in the training period as possible.

From this it can be seen that aircrew selection has two points of reference: the student in training and the experienced airman as part of a fighting force. Only by continuous investigation can standards of physical fitness and testing procedures be adjusted to produce the highest correlation with flying achievement, and thereby attain their most satisfactory predictive value. As the conditions of aerial warfare develop, so must the criteria of selection be refined. In practice, the term pre-selection is used to denote the examination procedures conducted between the time of application at the Recruiting Centre up to and including the level immediately preceding flying training, which for pilots and observers is the Initial Training School and for the wireless operator air gunners, the Wireless School. Actually, selection is a process of continually finer screening, and does not end with pre-selection but is carried forward into the training program and is later applied to experienced personnel, in whom particular qualities are sought for special types of flying.

There are many factors of outstanding importance in the medical selection of aircrew. Time does not permit the detailed discussion of standards, but brief comments covering the general principles on which such standards are based may be of interest. The great majority of those failing to reach the medical standards are eliminated at the Recruiting Centres, while the remainder are screened out by the Medical Selection Board at Initial Training Schools.

It can be said that those organic diseases and mechanical defects which eliminate a man for ground service will likewise make him unsuitable for aircrew, although it should be kept in mind that greater leniency can be allowed with minor foot defects, as the demands for weight-bearing are not so exacting as those for personnel operating on the ground.

The limits of height and weight, other than that extremes may be indicative of organic disease, are governed by aircraft design. A pilot must have sufficient leg length to reach the rudder control and at the same time have clear vision above the cockpit. The build of the air-gunner, clad in bulky flying clothing, must be such as to allow him free movement in a compact gun turret.

Visual standards are applied with specific reference to the various positions in aircrew. A pilot is not expected to have the degree of visual acuity demanded of the observer or gunner. On the other hand, his visual judgment must be of a high order so that he may be able accurately to judge height, distance and speed. It is recognized that this ability is an expression of both monocular and binocular vision, but of even greater importance, it is definitely a visual-psychic phenomenon. In other words, visual judgment cannot be expressed solely in terms of prism dioptres of deviation or some other such type of physical measurement. In this respect, parallel studies on experienced pilots and airmen whose training has been discontinued because of landing difficulties, have shown that anisoeikonia in the amounts discovered has little correlation with flying performance. On the other hand, a manifest hypermetropia of 2.5 dioptres, for example, is cause for rejection. Experience has demonstrated that readings in excess of this are apt to produce disturbance in accommodation and depth perception, especially after fatigue.

Colour vision is roughly screened by use of the Ishihara test charts. Candidates found defective by this test are rechecked on either the Edridge Green or Giles-Archer lamp. Approximately 50% of the candidates found defective on the Ishihara test are unable to reach the lantern standards. The necessity for safe colour vision is obvious in recognizing flares and signal lights, both in the aircraft and on the ground.

With the emphasis on night fighting, the ability to see under conditions of low illumination becomes important. Night visual capacity is estimated by Livingston's rotating hexagon. This instrument has been used in the United Kingdom for some time and is based on the acuity of the form sense under conditions of illumination equal to a starlit night with and without a moon. The test serves merely as a rough screen.

Upper respiratory infections and defects require special consideration. With the marked changes in atmospheric pressure produced by rapid ascents and descents, one's attention need merely be directed to the middle ear and paranasal sinuses, rigidly enclosed in bone, to appreciate the acute pain that will arise if the passages connecting these chambers with the outside air are not freely patent. Sinusitis, blockage of the Eustachian tube, and evidence

of chronic middle ear disease are causes for rejection. Infected tonsils or a markedly deflected nasal septum may form the background for future trouble and therefore require correction before training can be undertaken.

There is no place in aircrew for the epileptic. A loss of consciousness, if only of a few seconds' duration, may endanger the life not only of the pilot but of the other members of the crew, and result as well in the loss of an expensive aircraft. Electroencephalograms are taken routinely on all pilots and observers, and characteristic slow episodes occurring spontaneously or after hyperventilation are ruled unsuitable. Unfortunately, the test is limited by the fact that the absence of these episodes does not rule out the possibility of epilepsy, since an individual may have a grand mal attack only a few minutes after a normal tracing has been obtained. It is felt, however, that greater success is experienced in the detection of petit mal and subclinical epilepsy. The evaluation of electroencephalographic patterns as a means of assessing flying aptitude shows certain promise.

Time does not permit a detailed discussion of the cardiovascular system in its relation to flying. Suffice it to say that any interference with pulmonary ventilation or circulation to the extent that oxygen saturation of the blood is affected, will result in a lowered altitude tolerance. For this reason, emphysema, asthma, bronchitis, a history of spontaneous pneumothorax, or any evidence of congenital heart disease or anaemia are causes for rejection. Within recent years attention has been directed to the occurrence of coronary occlusion in the younger age groups.^{1,2} This fact is considered of importance in aircrew selection, and the electrocardiograph is widely employed. In this respect it is to be noted that accepted standards of electrocardiographic interpretation are based only to a limited degree on data collected from normal subjects in the age group under consideration. The R.C.A.F. have taken tracings on many thousands of apparently healthy young men and subjected the records to careful study. From this work³ it would appear that certain abnormalities which, if found in a more advanced age group would justify an unfavourable interpretation, may be of less clinical significance in the young adult. Great care, therefore, must be exercised before a young man physically normal by all other standards is condemned on the sole evidence of an electrocardio-

gram. It is not intended by this to discredit the value of the electrocardiograph, but only to point out some of the pitfalls that have to be avoided in its use.

The time-honoured tests of cardiovascular efficiency, based on pulse and blood pressure responses to various forms of exercise and to changes in body position, are too crude in their present form to measure the efficiency of the cardiovascular system as a haemodynamic system. They reflect, rather the general physical fitness of the individual, and form the basis on which to judge alterations in normal health that may occur in the future. In order to measure individual resistance to partial or complete cardiovascular collapse, as evidenced in blacking out, intolerance to anoxia, etc., a more accurate frame of reference is required. Tests for physical fitness show little correlation with flying achievement, as was pointed out by Whittingham⁴ and later confirmed by studies in the R.C.A.F. In this respect one must caution against the practice of assuming that fluctuations in blood pressure and pulse rate are necessarily indicative of emotional instability. That these signs are evident in the unstable type is true, but they are also found in certain trainees who show outstanding flying ability. The differentiation, therefore, must be made not on pulse and blood pressure alone, but only after consideration of the individual as a whole.

Quite apart from physical considerations, selection in training attempts to measure the ability of the individual to acquire new mental and mechanical skills which he will be expected to use in an unfamiliar environment. It is obvious that this ability to learn to fly requires a certain level and speed of cerebral function. In the R.C.A.F. levels of intelligence are established through educational standards, though more accurate information is obtained by the Classification Test, which is essentially a mental alertness test, and by the trainee's achievement in basic ground examinations. Mention has been made of the additional assistance which may be forthcoming from the electroencephalograph.

Psychomotor co-ordination is another essential factor in learning to fly, although it would seem that the measurement under laboratory conditions of the degrees of co-ordination required in flying is apt to show but little correlation with actual flying performance. The fault lies not in the mechanics of the test procedures, but is directly related to the degree with which the

conditions of the testing situation fail to approximate those of actual flying. A properly standardized Link trainer with the visual illusion of flying, in which the attitude of the candidate conforms to that of the machine, will have a much higher predictive value than an apparatus which can measure the same degrees of co-ordination but allows the subject to remain in the horizontal plane fixing his gaze on some artificial stimulus.

Of the greatest importance in flying is the psychological constitution of the candidate. From the moment the trainee takes to the air he is exposed to risks which demand his unceasing concentration to avoid. As his ability and self-confidence improve through training, he is faced with situations of greater complexity and stress to which he must adapt himself. He is required to operate more heavily powered aircraft, capable of rapid ascents and descents, and must master night flying and flying under poor weather conditions; glare, cold, physical exhaustion and decompression sickness all have to be contended with. These stresses are related to his occupation and have to be met in addition to the hazards of enemy action. A well balanced and closely integrated personality exhibiting self-confidence and emotional stability will be less likely to break under the strain than the timid, over-anxious, hypersensitive type. The ability to withstand these stresses, therefore, depends largely on the inherent qualities of the individual. There are limits, however, to human endurance, and even the most stable member of aircrew will deteriorate under conditions of prolonged physical and mental stress. By use of the personal interview, a special psychiatric enquiry is made into family stability, childhood habits, past neurotic episodes, excessive fears, occupational history, and evidence of obsessional and psychopathic tendencies. A high degree of motivation is considered essential to success and the conditions of enlistment in aircrew have remained on a voluntary basis. In this respect, there is little doubt that the introduction of gliding as a national recreation would serve as a natural method of selection.

Flying is man's most recent accomplishment,

and like all situations concerning which little is known, standard requirements of necessity have first to be established on the basis of analogy. It may so happen that a certain physiological process is believed, on the evidence available, to be of importance in the act of flying. Through investigation, a scale of measurement must first be devised before it becomes possible to attempt validation of the original concept; nor can it be treated as a single item, as its true value may only be revealed when considered in combination with other factors. The complexity of the problem, by virtue of its many variables, precludes the possible existence of any underlying common factor which will give the answer to aircrew selection. Tests often have to be discarded, while others require revision or redesigning to meet more accurately the changing requirements of training and operational flying. To make this possible, a detailed system of follow-up is employed in the R.C.A.F. whereby all known factors of selection are assessed in terms of the various levels of flying achievement.

An attempt has been made to present the general picture of aircrew selection, emphasizing some of its more important medical aspects. It is a mistake to think of standards as being fixed, since new methods of aerial warfare, changes in aircraft design, variations in teaching procedures, must all be considered in respect to their possible effect on aircrew personnel. Much has been accomplished, but the very fluid nature of the problem makes constant investigation and revision of ideas a necessity. The search for the philosopher's stone must lead inevitably to that pool where all methods of prediction considered in relation to each other will accurately and economically select men of the type that recently visited Cologne and Essen.

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INSPECTION AND TREATMENT OF SOLDIERS' FEET*

BY CAPTAIN O. ROSTRUP, R.C.A.M.C.

DESPITE the high mechanization of our armies the soldier of today still must be able to march long distances and depend upon his feet as his basic means of locomotion. From the day a man first presents himself at a recruiting centre and is enlisted his feet become increasingly important to him. He cannot sit down or rest now as he could in civilian life. Thus, from the point of economy and efficiency, the proper evaluation of a man's feet at the beginning of his army career is extremely important. Individual feet vary markedly, and the estimation of how different pairs of feet will stand service has often been a matter of guess work. It is partly the purpose of this paper to supplement the standards already laid down.

The high incidence of foot trouble in Training Centres could be greatly reduced if greater care were taken in categorization. Associated with this is the strenuous training on a hard drill square in new boots with feet used to walking on soft ground, particularly in lads from the country and farms. That a large percentage of feet break down is not the fault always of the Medical Officer at the recruiting centre, but only too often of the ambitious drill sergeant neglecting to break men in properly.

INSPECTION OF RECRUITS

For the purpose of brevity let us assume that the Medical Officer at the Recruiting Centre is well versed in the various types and deformities of feet. Having carefully observed and examined the feet, both actively and passively, he must now assess them as to their capabilities. What the man has done in his daily routine previous to enlistment and the difficulties he may have had with his feet may be helpful—often it is not. Obvious deformities and disabilities are more easily assessed. It is the borderline cases which are difficult. The medical standards laid down serve as an excellent guide, but there are many exceptions.

Pes cavus, not mentioned in the Medical Standards Pamphlet, is not amenable to con-

servative corrections and will break down. Surgery, so far, is good for civilian life, but in the army the man still has disabilities. High arches, or the pre-pes cavus type of foot, on the other hand, may do well. Many people and families have a high long arch and get along exceedingly well, provided the vamp in the shoe gives them room. Unfortunately some of the boots first made for the army were tight across the instep for normal feet, but this has been corrected. With high arches it is important to make sure the individual has not a progressive condition which will develop into a *claw foot*.

Hammer toes are associated with claw foot but also occur by themselves or along with a fallen metatarsal arch. They are a disability according to their severity, number of toes affected, and if they show signs of previous corns or calluses on the dorsum. Surgery for hammer toes gives excellent results and where this has been done previous to enlistment, provided there is no disability, it should not affect the category.

Fallen anterior arches and *metatarsus varus* or widening of the forefoot, are amenable to treatment if of not too long standing. These feet can be greatly improved and become near Category "A". *Hallux valgus*, always associated with fallen metatarsal arches, if of long standing and with much deformity, does not rate higher than "B" category and in many cases no more than "C1". If much *traumatic arthritis*, *bursitis* and *exostosis* is present at the metatarso-phalangeal joints of the great toe it is questionable how valuable or acceptable he will be for the army. Surgery is the only cure and in good hands in civilian life yields excellent results. In the army the results are disappointing for obvious reasons. The foot which was operated on in civilian life for bunions may rate as high as "B2" providing the possessor is symptom-free, has gone at least a year since operation, and has not got a fallen anterior arch.

Pes planus is the commonest deformity and disability and in many ways the most difficult to assess. The rigid flat foot never does well and is category "E". It is the flat feet which are pliable with varying degrees of fallen arch

* Read at the Seventy-third Annual Meeting of the Canadian Medical Association, Jasper Park, Alberta, June 18, 1942.

which require some understanding and deliberation. We have all seen two pairs of feet with the same degree of pes planus, one pair of which is painful, and the other which is not. Then there is the extremely flat foot which is not painful and has not been for years. It is obvious that the degree of pes planus is no indication as to whether the feet are painful or not or whether they ever will be. The solution to this misconception is *muscle power*. The anterior and posterior tibial muscles are the main support of the long arch. When they become fatigued undue strain comes on the ligaments and joints of the long arch and the foot becomes painful. Repetition of this process leads to stretching of the ligaments and eventually to pes planus. Once an arch goes through the process where it is completely down, the strain in the ligaments and joints is diminished to such a stage that they eventually become painless. The muscle power needed in these feet for locomotion is less, so that the muscles soon develop sufficiently and the person can get about with the characteristic shuffling, springless gait. However, it is surprising sometimes just what these feet will do. If the muscles get the opportunity to develop where they can again support the arch before further deformity takes place, a foot may be salvaged and its efficiency restored. In slight pes planus with pain, graduated muscle development is the best cure. Long arch supports are usually necessary to supplement the muscles in supporting the arch until they are capable of doing the work themselves.

By testing muscle power it has been possible to evaluate feet to better advantage. This is done grossly by having the man stand and also walk on his toes for as long as he can. If muscle power is good he will stand for several minutes without wavering or leaning against anything. Also, regardless of his degree of pes planus, he will form some semblance of a long arch. The better the arch formed the greater the efficiency, particularly if it is painless. Individual muscle testing of the tibialis anticus and posticus should also be done. This requires experience in grading the muscles but can soon be acquired. Hence, pes planus feet, which are painless, which can form a good arch when on their toes and can stand there for some time, are good enough for category "A". If they are painless, but do not form an arch, and can barely get off the floor with their heels, these

feet will surely break down and should be given a low category.

The position of the os calcis should also be noted. It is a good indication of pronation of the foot if everted, and *talipes varus* if inverted. For it is the most persistent component of these deformities and the last to disappear. An everted os calcis indicates a strained subastragloid and astragalo-scapoid joint which are potentially painful and will undoubtedly become so with heavy service. Prominence and inversion of the astragalus goes with pes planus, but it is often difficult to estimate. The position of the os calcis is easily seen and estimated.

The loss of one or two small toes does not affect foot mechanics whatsoever, but the loss of the great toe takes spring out of the gait and lowers a man's category. The loss of the terminal phalanx of the great toe will only affect the category if the gait has been affected. *Old injuries* to the feet such as axe cuts, crushing injuries and fractures, have to be categorized according to each individual case. Deformities, limitation of motion of the small joints of the foot and painful scars, particularly on the sole, will vary the category from "E" and up.

THE SOLDIER'S FEET

Once a man is in the army he goes through a period of strenuous basic training and hardening for several months. At this stage there is a high percentage of breakdowns. The causes of these are mainly two. First of all, many training centres start off with rigorous training without giving the men time to harden themselves gradually and break their boots in. Men coming off farms particularly, and drilled on a hard square, are the most frequent cases. It is the duty of the Medical Officer to see that this does not occur, for prevention of acute foot strain, metatarsalgia and pes planus is much easier than curing it. Secondly, feet which were categorized too high at enlistment will feel the strain when they are asked to go beyond their capabilities. These will have to be categorized lower and although a certain percentage of these cases will always occur, it is hoped this "test of labour" method will give way to a better and more accurate evaluation of feet.

Inspection of the soldier's feet is chiefly the duty of the platoon officer who should have a thorough knowledge of foot hygiene. Foot hygiene is best defined as the care of feet and

foot-wear. Besides this the platoon officer must know what to look for in the way of foot disabilities and have them report to the Medical Officer. Conscientious and able foot inspection by platoon officers will save many from serious foot trouble and assist the Medical Officer greatly. Care that boots are a proper fit, that boots and socks are in good repair, cleanliness of socks and feet, the proper use of foot baths and proper care of nails and the feet generally, should be supervised by the platoon officer. Any disability requiring medical care should be reported to the Medical Officer.

Blisters are treated by drainage and leaving the raised skin *in situ*. Boots and socks should always be inspected to see if there is any rough seam or mend causing the blister. Scalds are usually caused from dirty socks and sweaty feet. Sweaty feet may be an early sign of foot strain and this should be ruled out. Some people have normally sweaty feet and will have to change socks more frequently. The use of a 0.5% formalin bath is useful as a temporary treatment, but it is no cure and will have to be repeated from time to time. Ingrown toe nails usually come from too short a boot, improper cutting of the nails, or poorly fitting socks. Toe nails should be cut straight across at right angles to the long axis of the toe. Filing the nail as thin as possible in the centre will often prevent ingrowing nails.

Major disabilities of the feet present more difficult problems. Often one wonders how a pair of feet ever got into the army and how they ever carry the man around. Others will be disabilities of various degrees who are unable to carry on. Thus it must be decided if the man is worth salvaging at all, if he should be re-categorized lower, or if, with treatment, he can maintain his present category.

Metatarsalgia and metatarsus varus respond well to treatment. The metatarsal arch pad fitted in the boot or on a removable insole seems to be the most successful. The pad here can easily be adjusted, and once the man gets on to it he can look after it himself in future. In old cases which do not respond to the metatarsal pad after it has been tried, the metatarsal bar gives good results. The metatarsal pad is favoured because it is out of sight, does not add appreciably to the weight of the boot, and in the stiff army boot gives better correction than any type of bar can working through a thick, stiff sole.

Corns on the fifth toe and between the toes are nearly always associated with a fallen anterior arch. Removal of the corns, either by scalpel or salicylic acid gives temporary relief, but correction of the cause will be permanent and much more satisfactory. Calluses over the heads of the metatarsals are caused in the same way and the cure is the same.

Acute foot strain, without any particularly associated lesion, requires rest in bed with daily heat and massage to the foot and leg. When the acute tenderness is gone graduated exercises and muscle building must follow. Here recovery is estimated by the disappearance of sweating and tenderness in the foot and aching in the muscles of the calf. If the foot strain is accompanied by pes planus this will have to be treated as well.

Pes planus makes up the bulk of foot troubles and it is often difficult to decide whether a man is going to be worth salvaging or not. If the disability is an old one and little or no arch is present the best that can be hoped for is to relieve him of his symptoms by long arch supports, muscle training and regulation of his activities according to what he is capable of doing. Those with no arch or very little arch frequently find supports make them worse. Some will have to be discharged and others lowered in category according to what they are able to do. Those cases which are fairly new, with some semblance of an arch, do very much better. Long arch supports are much more effective and they are able to build up muscle power and re-establish a painless arch in a greater percentage of cases. The use of the Thomas Crooked Heel on army boots with its thick, non-flexible sole, does not obtain the results it does in the civilian shoe. The thrust obtained is minimal and too often not enough. The insole and pad of the envelope type used inside the boot gives support directly to the foot and can easily be regulated. Supplying of arch supports is only half the job. Institute adequate muscle training and many feet will become painless and highly efficient. Unfortunately in the army this requires constant supervision and also co-operation with drill sergeants who seem more determined to break down the arches so that these hopeful results are seldom attained. Excuse duty without proper supervision and muscle training defeats the purpose, and light duty in too many cases is "*darn hard work*".

In treating pes planus the most important part is the most difficult to attain—muscle building. Unless the man does the exercises religiously and earnestly he gets no results. Too often the feet are not given enough time and they never become free from pain. These people should all be put to bed and given heat and massage and active exercises without weight-bearing, under strict supervision. When the feet are free from pain weight-bearing in boots with proper fitting supports is then gradually started by standing for a few minutes daily and gradually increasing the exercise and time up, always stopping before the foot becomes painful. Obviously this sort of treatment takes trained help and time. In early cases it is worth while. In longstanding cases the long time spent is seldom worth the results obtained, particularly where time is a factor.

With hallux valgus, increase in deformity in early cases can be prevented by treating the fallen metatarsal arch which always accompanies it. For it is the widening of the forefoot with its resultant increased tension on the oblique and transverse heads of the adductor hallucis brevis attached to the medial side of the base of the proximal phalanx of the great toe which causes the deformity. Release this abnormal pull and you treat the cause. Feet, with well advanced deformity which is disabling should be recategorized according to the dis-

ability. Surgery is the only cure, but in the army should only be done on selected cases. Even following a good surgical result a man seldom rates higher than "B1".

Painful heels either from calcaneal spurs or periostitis are much relieved with a one-quarter inch tapered heel cushion of rubber or felt. If there are any definite tender areas redistribution of weight-bearing areas can be accomplished by cutting a hole in the cushion or pad to take the weight off the painful area. Calcaneal spurs, once they reach a certain stage of "ripeness", cease to be painful so that surgical removal is seldom indicated.

CONCLUSIONS

1. Inspection of feet at time of recruiting is most important from the point of view of economy and efficiency.
2. Early training should be gradual, to break in the new recruit and not break his feet down.
3. Platoon officers and the men should be taught and disciplined in foot hygiene.
4. Treatment of minor conditions as blisters, etc., is most important to prevent more serious foot conditions.
5. The major disabilities will have to be assessed and treated if indicated along conservative lines. Surgery, at present, should only be allowed in very selected cases and then its value is open to doubt in the army.

METRAZOL COMPLICATIONS AS AFFECTED BY THE USE OF CURARE

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MENTAL diseases may be classified briefly into three groups. (1) Psychoses associated with organic changes or demonstrable disease in the brain. Most common of these are general paresis, psychosis with cerebral arteriosclerosis, senility and the traumatic psychoses. (2) Psychoses of toxic origin, examples of which are, the delirium of pneumonia, drugs or metal poisoning. (3) The psychogenic psychoses. In this group no pathological changes in the body are demonstrable, and no toxic factor has been found. There is however, considerable evidence to indicate that they develop in susceptible persons, subjected to unusual emotional strain, generally caused by unhappiness, insecurity, indecisiveness, emotional conflict, or similar

worries. The most common mental illnesses in this group are manic depressive psychoses, involutional psychosis, psychoneurosis (*i.e.*) neurasthenia and hysteria, etc., and schizophrenia.

At this hospital only those cases mentioned in group (3) have been treated with metrazol. The efficacy of metrazol treatment for these illnesses is indicated in the manner in which the cases are listed. The best results are obtained in the manic depressive psychoses, particularly the depressed phase. In England some writers have recently reported the use of metrazol in selected cases from group (1). They describe, for example, cases of general paresis of the insane, whose mental symptoms, such as depression or elation, hallucinations and delusions, did

not subside after the usual therapeutic measures had been employed. In these cases metrazol therapy brought about a cessation of mental symptoms.

DESCRIPTION OF METRAZOL TREATMENT

About 1929 it was noted that epilepsy and psychogenic mental illnesses rarely occurred in the same person. When they did, the mental illness tended to improve. There followed, as a result of these observations, a therapeutic procedure for psychogenic mental disease, now known as metrazol shock treatment. This treatment consists of the injection of a 10% solution of metrazol intravenously, in 5 c.c. or larger

doses. In England metrazol is known as triazol, and it is used as a cardiac and respiratory stimulant in 1 c.c. doses. Metrazol in many respects is similar to coramine. In large doses it is relatively safe, but sufficiently noxious to produce a convulsion. Metrazol convulsions, when produced in cases of psychogenic mental illnesses tend to alleviate or cure the mental symptoms. Treatment is administered two or three times a week, until a total of fifteen or twenty convulsions has occurred. Recovery, or marked improvement, usually occurs with less than ten convulsions. Cases treated early have a better prognosis than those of long standing.



COMPLICATIONS

Since September, 1938, treatment of a total of 365 cases has been completed. At the time of writing 240 of these cases are out of hospital. Out of the remaining 125 some patients have spent a total of 210 months on probation. Heart failure is, of course, the most serious complication. Fortunately we have had no such instances, largely because only cases with normal cardiovascular systems have been given the treatment. Dislocation of joints is rare, and no cases have occurred at this hospital.

Fractures are the second most serious complication. When treatment was commenced at this hospital forcible restraint of all movements of the patient during the convulsion was popularly recommended, to prevent dislocation and fractures. A gag was placed between the teeth and the teeth were forcibly held closed on this gag, while the convulsion lasted. This procedure has been very satisfactory, and has never been abandoned. No fractures nor dislocations of the jaw have occurred.

Restraint of lower limb movements was accomplished by holding the thighs firmly against the bed, the patient lying on his back. Case 1, the 56th person to receive metrazol, a very muscular and powerfully built young man, sustained bilateral fractures of the neck of both femurs in the tonic phase of his fourth convulsion. Since then no restraint of the lower limbs has been applied, and there have been no further complications of them. Fig. 1 shows this injury after the pinning. Clinically, return of function to the left leg is excellent. In the right leg there is still some impairment of function. This patient was unimproved with treatment. He had been in hospital for five years prior to treatment. He had always been very apathetic and indifferent, and spent most of his day sitting idly about. Inactive persons with illnesses of long duration are more liable to complications and less likely to be helped by treatment.

Conduct of the arms during the convulsion has varied slightly, although no injuries have occurred to them. Slight effort is now employed to keep them in a folded position on the chest wall.

Compression fractures of the bodies of the thoracic vertebrae have presented the greatest problem. One hundred and twenty-five of our cases were treated before this complication was known. Follow-up bi-yearly reports from these

patients have not included any complaints relative to back injury. It may be appreciated from a study of the vertebral column how these fractures occur. In the region of the thoracic vertebrae there is a natural kyphosis, most marked from the fifth to the seventh thoracic vertebrae inclusive. It is at this latter site that practically all compression fractures of the thoracic vertebrae occur with metrazol treatment. Consider the region of the fifth to seventh vertebrae as the middle of the arch of a bow and the lumbar and cervical regions the ends of the bow. It is now obvious how the strong convulsive contractions of the extensor back muscles, alternating with the flexor muscles of the trunk, throughout the clonic phase of the convulsion, tend to bring the greatest stress on the fifth to seventh vertebrae.

In the next 122 cases treated, radiographs of the vertebrae were taken before and after treatment. A total of 18 cases showed changes of their thoracic vertebrae. All radiographs reported in this paper were read by Norman L. Easton, M.B.* and Joseph Sommers, M.D.† For descriptive purposes, these changes will be referred to as marked, moderate and slight.

There was only one case with marked compression, and the amount of trauma is shown in Fig. 2. There are compression fractures of the bodies of the sixth and seventh thoracic vertebrae, with also suggestive evidence of injury to the fifth vertebra.

This case was the first one diagnosed. Although he was very unco-operative to treatment of his fractures, he has been at home now for one year, and has resumed his former occupation as farm labourer. He has no complaints relative to his back injury. There is some deformity, i.e., kyphosis, at the site of the fracture.

Fig. 3 shows a moderate compression fracture of the fifth thoracic vertebra. There were two cases of this type. One is at home and the other is still in hospital. Neither has any disability or complaint relative to his back injury.

Fig. 4 shows lipping and thickening of the bones at their articular surfaces. This figure represents approximately the amount of injury to the remaining fifteen cases. None of the fifteen have any disability or complaint relative to their vertebrae. Five are still in hospital.

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When the above 122 cases were receiving treatment, an attempt to prevent these fractures was made by mechanically hyper-extending the thoracic vertebral column. This was accomplished by placing pillows or a sandbag under the thoracic region. The former was more satisfactory.

Curare.—Curare has been used at this hospital since December, 1940. One hundred and eighteen patients have received courses of metrazol therapy supplemented by the preliminary administration of this drug. There have been only four compression fractures of the vertebrae and no other complications of any kind with its use. The extent of the compressions is slight and is comparable to those in Fig. 4. The incidence of compressions with curare was 3.4% as compared to 14.8% without curare.

Curare is sold by Squibb and Sons under the trade name "Intocostrin". It is put up in 5 c.c. vials, and 1 c.c. contains 20 mgm. of active curare. Curare comes from South America, where the natives have for many years used it as an arrow poison. It acts at the neuro-muscular junction by interrupting the nervous impulse. It does this by neutralizing acetylcholine, which is essentially the neuro-muscular stimulating mechanism. When administered intravenously it paralyzes the skeletal muscles first and the intercostal muscles and diaphragm last. The drug is excreted rapidly and its action is transient. It must be injected slowly over a period of one minute. Two to three minutes are allowed for the curare to become effective, and then the metrazol is administered.

The margin between the treatment dose and the dose that will cause paralysis of the respiratory muscles is small, and, therefore, careful attention must be given to the amount used in each case. One mgm. of the active curare to two pounds' body weight has been found adequate and safe, although 10 mgm. less than this should be given on the first occasion, especially in obese patients. With this dose some persons have paralysis of the neck muscles, and are unable to raise their heads. Paralysis of the muscles of the neck at first appeared to be the ideal sign that the optimum dose of curare had been reached. It however is not wise nor necessary to raise the dose and try to obtain paralysis of the neck muscles. Early in the use of this drug, I gradually worked a 150 pound patient up to 120 mgm. of active curare without any

appreciable paralysis of the neck muscles. Marked paralysis of the muscles of respiration, however, did occur. This was successfully overcome by administering prostigmine, 2 c.c., intravenously. Prostigmine is a spectacular and perfect drug for this emergency. It unites with the curare and frees the acetylcholine which is the nervous impulse. Artificial respiration has also been used in conjunction with the prostigmine, but does not compare in usefulness. For some time attempts to paralyze the muscles of the neck by gradually raising the dose caused varying degrees of respiratory embarrassment, all of which readily responded to the administration of prostigmine.

Following the above experience it seemed that a dose of 1 mgm. of active curare for 2 pounds of body weight was a safe dose and sufficient to greatly reduce the number and degree of compression fractures of the bodies of the vertebrae.

In two cases preliminary radiographs revealed generalized osteoporosis. These cases were not treated.

The results obtained in the 118 cases treated with curare and metrazol, have been compared with the 118 consecutive cases treated immediately prior to the use of curare. No evidence was found to suggest that the curare detracts in any way from the therapeutic effect of metrazol.

CONCLUSIONS

Metrazol continues to be a relatively spectacular and useful drug in the treatment of selected cases of mental illness. When used in conjunction with curare the serious complication of compression fractures of the vertebrae were strikingly reduced in frequency and severity, from 14.8 to 3.4% in the last series of 118 patients.

Clinically, none of these compression fractures of the vertebrae were associated with any disability or complaints. Complete radiographic evidence of all trauma sustained in the treatment of 365 cases is presented. One person only, an already chronic hospital case, showed any permanent clinical disability.

Because mental illnesses tend to run a long course, and because the disease completely disables the sufferer, it would seem reasonable to conclude that the complications encountered were justified.

I am indebted to Frank Driesinger, staff technician, for the reproductions.

INTERATRIAL SEPTAL DEFECT WITH REPORT OF A CASE

BY S. T. LAUFER

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INTERATRIAL septal defect as a single lesion is an uncommon congenital cardiovascular malformation and its diagnosis can be made clinically in many cases, especially on the basis of certain characteristic radiological features. (Assmann,¹ Roesler,² Bedford *et al.*,³ etc.).

CASE REPORT

History.—A white female, aged twenty-two years, was admitted to the Halifax Infirmary in August, 1941, complaining of dizziness, weakness and attacks of palpitation associated with shortness of breath while at rest. She had had one attack of pounding and weakness last year, and at that time her ankles were swollen. From her earliest years she was known to have a heart condition, and although she could not play with the other children on account of dyspnoea when running around, she was able to attend school, and high school as well, and was teaching until lately, when dizziness and weakness prevented her from continuing her activities. There was no history of rheumatic fever, and except for the common childhood diseases (measles, mumps) she had always been well. Tonsillectomy was performed four years ago.

Physical examination.—The patient appeared rather undernourished, but was alert and did not present any clubbing of the fingers or toes, or cyanosis. The skin was moist and the thyroid somewhat enlarged. Examination of the head, neck, mouth, throat and eyes, including ophthalmoscopic examination, proved essentially negative. No râles were heard over the chest, but a systolic heart murmur, transmitted all over the posterior chest-wall, was detected. The veins of the neck showed visible pulsation, which proved to be a systolic venous pulse.

Heart.—The apex beat was not visible or palpable, but certain very interesting movements of the anterior chest wall were observed, namely, a systolic propulsion over the præcordium extending from the left border of the sternum to the left as far as the mid-clavicular line between the third and fifth ribs. Beyond this area to the left the chest wall showed a slight depression, while above, corresponding to the second interspace and second rib, another systolic propulsion was observed extending as far as 7 cm. outside the midclavicular line. The lower sternum moved with the epigastrium inwards during systole, in a saw-saw fashion. On the right side of the chest, in the third interspace, and below the fourth rib, an area of pulsation extending two finger-breadths from the right sternal border was also seen during systole. No thrills were felt. On percussion the heart appeared greatly enlarged, dullness being found to the left in the second and third interspace, over the lower sternum, for over 4 cm., and on the right side in the third and fourth interspace. Auscultation revealed a loud first sound with a slight presystolic accentuation and a short, sharp systolic murmur over the apex region and centrum cordis, decreasing in intensity towards the base. The second sounds were audible over all ostia but were not accentuated. Blood pressure: systolic 115 (120), diastolic 68 (78). The heart rate was regular except on the first examination when auricular fibrillation was found, with a ventricular rate of 96, two days after the onset of palpitation. The electrocardiogram showed right ventricular preponderance, notching in the descending limb of RS, in lead two and three, a biphasic T₂, and negative T₃ (see Fig. 2).

The x-ray examination showed an enlarged heart with a globular outline and very prominent pulmonary arch. The aortic knob was not visible. The pulmonary branches appeared enlarged, sharply defined, and pulsating (hilar dance). The lung fields were transparent and the diaphragm low (see Fig. 1). In the oblique position no enlargement of the left auricle could be detected.

DISCUSSION

The movements of the chest wall are described in some detail because they are so characteristic of right-sided dilatation (and hypertrophy) (Roesler). The importance and interpretation of the chest movements in the affections of the cardiovascular apparatus have been recently stressed by Dressler,⁴ whose studies have not only brought about a better understanding of this important clinical method but have also led to the description of pulsatory phenomena which may be found associated with almost any form of heart affection leading to hypertrophy or dilatation of the various chambers. For the interpretation of the different chest-wall movements in the above case, the reader is referred to Dressler's book or papers.^{4a, 4b}

I wish to stress, however, that the lack of a circumscribed apex thrust in the presence of the systolic impulse of the described area of the præcordium as given above, agrees well with the picture of right-sided dilatation (and hypertrophy), which is a leading feature of interatrial septal defect. But it may be stated that the diagnosis in this case was made mainly upon the radiological features. The prominence of the pulmonary arch, the dilatation and increased density of the branches of the pulmonary artery, their pulsation (hilar dance), the absence of enlargement of the left auricle in the oblique view, the invisibility of the aortic knob, all of which are present here, comprise almost all the characteristic radiological features described for this malformation (see Roesler, Bedford *et al.*, etc.). On the other hand, the clinical findings of right-sided dilatation and hypertrophy, indicated by the pulsations of the chest wall, the systolic venous pulse, and the absence of heart-failure, are in full accordance with the radiological and clinical features found in this cardiac abnormality.

The only point in question is whether mitral stenosis is associated with the atrial septal defect in the present case. The single attack

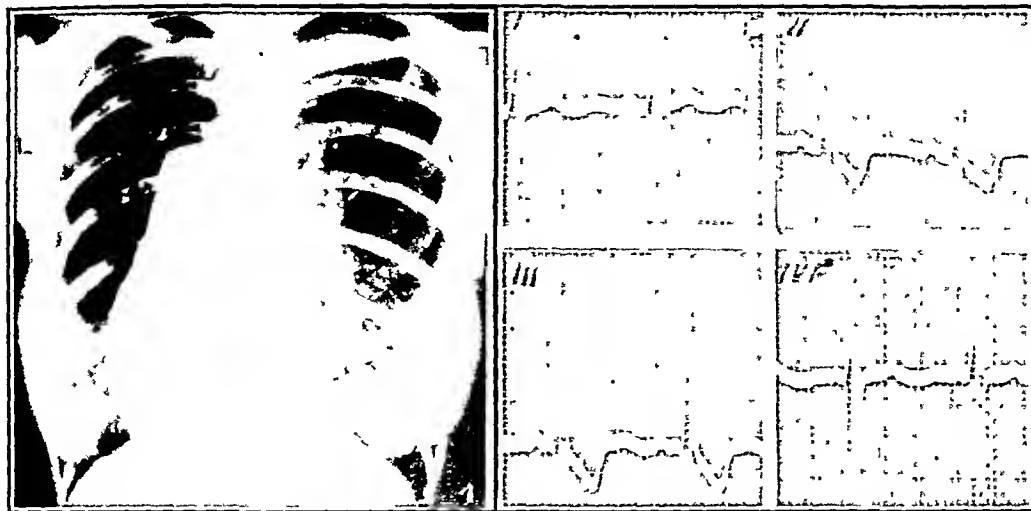


Fig. 1.—Anterior view. Dilated pulmonary artery, increased density of right branch of pulmonary artery (which pulsates at fluoroscopic examination), low diaphragm. Fig. 2.—Electrocardiogram showing right axis deviation and inverted T waves in lead 2 and 3.

of fibrillation has been mentioned earlier. As Bedford *et al.* have pointed out, the radiological features, with or without mitral stenosis, are similar, as they did not find the left auricle enlarged in all post-mortem cases in which mitral stenosis was associated with atrial septal defect, but auricular fibrillation was present in every case of atrial septal defect with mitral stenosis. Their histories, however, do not reveal how long before death the irregularity was noted. It may well be that auricular fibrillation appears only as a late complication, and in such a case our observation of the onset of fibrillation at a time when the patient was at her worst, may indicate that mitral stenosis is associated with the septal defect.

Diagnosis.—Although the differential diagnosis of the various conditions associated with dilatation of the pulmonary artery and its branches is discussed fully in Bedford's article, the following four points should be taken into consideration.

1. *Mitral stenosis*—In a case of pure mitral stenosis with such extensive dilatation and hypertrophy of the right ventricle, it is reasonable to expect signs of congestive failure. However, the absence of the latter, together with the absence of enlargement of the left auricle, the presence of the clear lung field and hilar dance, exclude mitral stenosis.

2. *Mitral stenosis and relative pulmonary incompetence*—The hilar dance is present in such cases but the absence of any diastolic murmur and an enlarged left auricle negative its association here.

3. *Patent ductus arteriosus*—In this congenital heart condition a large pulmonary artery and its branches is observed and a hilar dance has, on occasion, been seen where the ductus is very large (Gross⁵). But the absence of any characteristic murmurs, of congestion in the pulmonary fields, and mainly the right axis deviation of the electrocardiogram (Drawe *et al.*⁶) are sufficient evidence against this congenital abnormality.

4. *Pulmonary stenosis* (with normal ventricular septum).—In addition to the presence of the second pulmonic sound, enlarged pulmonary branches are not found in this malformation.

Prognosis.—This congenital abnormality is considered relatively benign, the average duration of life being thirty-six years (Roesler). In the present case, however, the history of the attacks of palpitation, dyspnoea and auricular fibrillation suggest a stage of early cardiac failure.

I have to thank Dr. J. V. Graham for his kindness in referring this patient to me, and Professor Ralph P. Smith, of the Department of Pathology, at Dalhousie University, for his aid in the preparation of this paper.

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INTERNAL BILIARY FISTULÆ

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FISTULOUS communications between the gall bladder or the bile ducts and an adjacent viscus is a relatively rare finding. Clinical diagnosis of the condition has always been difficult, if not impossible. Since the use of the x-ray the condition has been more or less stumbled upon periodically, during a barium meal or barium enema examination. The majority of such reports come from European workers; two were so diagnosed in the present series of five cases. These make up all of the cases of internal biliary fistula diagnosed in the Montreal General Hospital in the last five years. Prior to that date the diagnosis was not present in our files.

The common cause of an internal biliary fistula is the presence of biliary calculi; with the modern means of examining the gall bladder these cases come to operation early and the terminal stages are not encountered. In the past such oddities as fistulæ between the bile ducts and genitals have been reported; for example, between the gall bladder and a pregnant uterus; or between the gall bladder and an ovarian cyst; also, between the gall bladder and the vagina. Again, fistulæ have occurred between the common and hepatic bile ducts and the portal vein; also between the bile passages and the pleura, the bronchi or the pericardium. Gall stones have been coughed up, vomited up, and passed by way of the rectum, vagina and urethra. The commonest mode of exit has been through the anterior abdominal wall, others have been content to remain retroperitoneal.¹

Roth, Schroeder and Schlöth, in 10,866 autopsies found 43 cases of internal biliary fistulæ; 19 of which were between the gall bladder and duodenum, and 16 between the gall bladder and colon. Courvoisier and Naunyn collected 384 cases: 93 of which were between the gall bladder and the duodenum and 49 between the gall bladder and the colon; 12 were between the bile passages and the stomach and 15 between the common duct and the duodenum; 184 were between the bile passages and the external abdominal wall.¹ Only one of the latter cases has occurred in this hospital in the past five years, and it was following the removal of a gan-

grenous gall bladder, with operative injury to the common duct. It is not included in this series.

Courvoisier (1890) stated that biliary fistulæ, of some variety, occur in 2.6% of autopsies in which gall stones are found. Kellogg cites 10 instances of fistula between the gall bladder and duodenum and one of fistula between the common duct and the duodenum.²

PATHOGENESIS

Fistulæ have been reported as the result of a foreign body lodged in the biliary system. Objects found in the biliary tract include swabs, thread, bristles, gauze, fruit seeds, cherry stone, steel needle, piece of wire, handle of a spoon, blade of hæmostat, bullets, rubber drains, absorbable and non-absorbable suture material.^{3, 4, 5}

The fistula may be secondary to a liver abscess or hydatid cyst. It may be secondary to the invasion and necrosis of a neoplasm from an adjacent viscus; or have its basis on a gastric or duodenal ulcer. Rarely, biliary fistulæ may be caused by trauma, either a penetrating wound or abdominal contusion; postoperative fistulæ may also be included in the traumatic group, these due to accidental incision, or ligature, causing stricture of a bile duct, or due to the pressure of gauze drains with the concomitant erosion, ulceration, abscess and fistula formation.⁶ Choledochoduodenal fistula may also follow the operation of transduodenal papillotomy for calculi.⁷

However, the most common etiological factor leading to the biliary fistula is the presence of gall stones. Gall stones are more frequent in women, especially in the obese. The same may be said for biliary fistulæ; in 153 cases from the Mayo Clinic,⁸ 111 were in females and 42 were in males. Pregnancy and diet do not influence the formation of gall stones. Typhoid fever is an important factor, as the gall bladder is frequently infected (many typhoid carriers have gall stones from which bacteria may be recovered years after the initial attack of fever).

There are two types of gall stones. (1) Metabolic; these are almost pure cholesterol, are

usually single and attain a large size. They are symptomless and arise at any time of life. (2) Infective stones; these are always multiple, and thus are faceted; they are composed of cholesterol, bile pigment and calcium salts deposited about a central nucleus of organic matter.⁹

Ulceration of the gall bladder wall is commonly due to the metabolic stones. The same may sometimes result from stones of the infective type, more especially where there are two or three large stones of this kind present. The sequence of events may be described as follows; the stone may remain in the gall bladder or become lodged at any point in the biliary duct system; there it produces erosion of the wall due to pressure, an irritative response is set up in the overlying peritoneum, which in turn becomes adherent to the peritoneum of an adjacent organ. The erosion and ulceration continue and the gall stone is expelled into the gastrointestinal tract, leaving a fistulous communication behind. With the associated infection the fistula may not take this direct route, but an abscess may intervene between the bile passages and the viscus.

The liver is apt to be enlarged in these patients, especially if the condition is of very long standing. The enlargement is due to a chronic cholangitis and hepatitis, which goes on to a picture simulating portal cirrhosis. The whole process leading to fistula formation may be painless, on the other hand symptoms may cease with the formation of the fistula. However, the infected gall bladder remains as a menace to health.

The immediate dangers associated with internal biliary fistula formation are, hæmorrhage, due to erosion of a blood vessel; or, what seems to be more common, intestinal obstruction by the gall stone. The latter condition almost always signifies a cholecystoduodenal fistula.

SYMPTOMS AND DIAGNOSIS

Judd and Burden found in 153 cases that the greatest percentage occurred in the sixth decade of life. The average duration of symptoms was 10 years. There is nothing particularly diagnostic about the history, some have freedom from symptoms occasionally lasting many years. They may have attacks of severe colic, but not

TABLE I.

No.	Sex	Age	Type of fistula	Gall stones	Diagnosis	Complications
1	F	61	Cholecystoduodenal	Not proved	X-ray; operation	
2	F	78	Cholecystoduodenal	Yes	Autopsy	Intestinal obstruction.
3	F	74	Cholechooduodenal	Yes	Autopsy	Hepatitis and pancreatitis.
4	M	64	Type not proved	Not proved	X-ray	Hepatitis, cholangitis.
5	M	61	Cholecystogastric	Yes	Operation	
6	F	39	Cholecystoduodenal	Yes	X-ray; operation	Duodenal ulcer.

Roth explained the common duet-duodenal fistula as being due to impaction of a calculus at the ampulla, with ulceration and destruction of the sphincter of Oddi. However, if this were the case we would expect cholechooduodenal fistulæ to be common. The rare common duet-to-duodenum fistula is found above the ampulla, probably formed on the basis of an abscess intervening.

These fistulæ are associated with a diseased gall bladder, which may contain infected bile and stones; duodenal, gastric or colonic contents are apt to ascend into the biliary system, along with gas. In the case of the gall bladder fistula, it will remain open only so long as the common duet is closed: otherwise the fistula contracts and closes (spontaneous and surgical alike).¹⁰ In this event the gall bladder becomes an empyema cavity.

always. Jaundice is not an outstanding feature. Fever may be present and of an irregular type.

The symptoms in some of the reported cases point to the presence of a peptic ulcer. Rightly or wrongly in these cases the biliary fistula has been considered secondary to the peptic ulcer. This must often be a difficult point to prove. The fact remains that in the 153 cases reported by Judd and Burden only 32 cases did not have gall stones. Of the five cases here reported three definitely had biliary calculi and the other two gave a very suggestive history. One patient gave a story pointing to cardiac disease which was eventually ruled out, the initial symptom in another case was acute intestinal obstruction due to a gall stone. The average duration of symptoms was five years. There were three women and two men making up this series.

CASE 1

Mrs. A.M., aged 61. History of pain in the right upper quadrant, on and off, for a period of three years; at the start the pain was colicky, often radiating to the back. Temperature 102 to 103° on several occasions during these attacks. Gaseous eructations, aggravated by fatty foods. She noted no change in the stools. No history of jaundice. Urine occasionally very dark.

Past history of typhoid at the age of twelve. No other illnesses.

Physical examination was essentially uninformative; patient obese, liver and spleen not palpable; blood pressure 175/90. Blood analysis showed a red cell count of 5,650,000; white cells 3,750; haemoglobin 80%. Stools clay coloured, bile test negative. Vnn den Bergh 0.4 units. Urobilinogen present 1/1,000 dilution. Wassermann test was negative.

Roentgenological examination.—Barium series: There was a constant incomplete filling of the first portion of the duodenum. Barium passed from the first portion of the duodenum into what appeared to be the gall bladder, and from there into the common bile duct; barium then passed upwards into the right and left hepatic ducts and into their radicles. The hepatic ducts were not dilated. At 6 hours there remained a 25% gastric retention and barium remained in the right and left hepatic ducts, there was barium also in the common duct. The entrance of the common duct into the duodenum was visualized; there was gas



Fig. 1

and barium within the gall bladder. At 24 hours there was a trace of barium in the hepatic radicles and a small amount of barium in the distal third of the common duct. Barium was scattered throughout the small bowel and the meal had reached the caecum. At 48 hours the meal had reached the splenic flexure, there was still barium in the small bowel, and a trace of barium in the common bile duct and in the right hepatic duct radicles. There was gas in the region of the gall bladder. There was still a trace of barium in the small bowel at 72 hours, probably from the liver region. No calculi were demonstrated.

Gall bladder: film taken after an intravenous dye obtained no visualization of the gall bladder. No calculi were seen. There was a persistent gas shadow in the gall bladder region; in the previous barium series this gas shadow filled with barium and it was presumed to be within the fundus of the gall bladder.

Barium enema: there was no obstruction to the enema, the colon being essentially normal. The bile ducts were outlined by gas, particularly the common duct and the right hepatic duct. There was gas within the fundus of the gall bladder.

Operation.—The abdomen was opened through a gall bladder incision; a mass was found taking up the region occupied by the gall bladder and the first

portion of the duodenum, no stones were palpable. This inflammatory mass including the gall bladder was separated from the duodenum and a hole left in the duodenum, which was then closed by suture. A posterior no-loop gastroenterostomy was then done. The gall bladder was hard and fibrous in character; it could not be removed without great difficulty and was therefore left, opened and drained. No stones were present in the gall bladder nor in the common duct.

Postoperatively the patient developed bronchopneumonia and died on the third day. No autopsy was obtained.

CASE 2

Miss J.D., aged 78. Patient claimed to have been well until two days before admission to the hospital. That evening she developed abdominal discomfort and two hours later had severe vomiting and pain. The vomiting persisted at intervals all night and the next day, it was copious, dark brown and foul smelling. The pain then lessened in severity. There had been no bowel movements for two days and she had been constipated for years. Temperature 100.4°, pulse 100, respirations 20. On examination of the abdomen it was rigid and tender, there was no visible peristalsis. The pain was more severe in the upper quadrants of the abdomen. No mass was felt. The white blood count 8,200. The Levine tube gave some relief, enemata were ineffectual. She died the second day after admission, with the clinical diagnosis of intestinal obstruction, cause undetermined.

At autopsy, the essential findings were as follows. A large gall stone (cholesterol) was found well down in the jejunum. The hepatic and common ducts were dilated, the cystic duct at its widest point measuring 3 cm. in circumference. The ampulla was patent and pointed into the duodenum. There were no gross stones in the extra-hepatic ducts, but, in the intra-hepatic ducts there was found a soft brown pigment. The cystic duct was patent, leading into a small fibrous gall bladder, measuring 3.5 x 2.5 cm. In it there was an irregular, hard, non-faceted stone, measuring 1 cm. in diameter.

The gall bladder was adherent to the first part of the duodenum, and the two cavities connected by a fistulous tract 1 x 1.5 cm. It entered the duodenum 1 cm. beyond the pylorus on the lateral wall. The duodenal mucosa was only slightly bile stained. The liver showed slight chronic hepatitis. The pancreas was negative.

CASE 3

Mrs. J.S., aged 74. Illness began in 1935 with pain in the upper right quadrant, nausea, vomiting and jaundice. The symptoms were partly controlled by diet. Admitted to the Montreal General Hospital on March 20, 1941, with severe pain in the right upper abdomen, nausea, vomiting and clay coloured stools. The duration of symptoms was two weeks. There was also oedema and loss of weight—23 lb. in 6 months. X-ray examination revealed a non-functioning gall bladder. The patient could not withstand an operation at this time. She was readmitted April 21st with an exacerbation of symptoms and jaundice. A laparotomy was done and calculi were found in the gall bladder and in the ducts. Because of her condition cholecystectomy was inadvisable, and a cholecyst-gastrostomy was performed. Her postoperative course continued down hill, with death one week later.

Autopsy revealed a bile peritonitis with many fine fibrous strands in the right upper quadrant, between the omentum and the gall bladder region. The fundus of the gall bladder was anastomosed to the pyloric region of the stomach. The gall bladder was empty, no stones were present, the stoma between the gall bladder and the stomach was patent. The common duct and the lower portion of the cystic duct contained nine small calculi. The ampulla of Vater was patent and at its base was found a large ulcer, measur-

ing 1.3 cm. in diameter, and communicating with the common duct. Lying free in the duodenum was a round calculus, measuring 1.4 cm. in diameter, brown in colour, on section showing a black centre and concentric rings. Opening into the ampulla of Vater was a large dilated pancreatic duct containing four calculi measuring up to 0.6 cm. in diameter, soft and yellowish-brown in colour. The pancreatic duct was found to be dilated in its distal third, beyond this point it was grossly normal. The liver showed mild chronic interstitial hepatitis, and there was also extensive chronic pancreatitis.

CASE 4

A man, aged 64. Lack of space will not permit of a full report on this case. An x-ray taken during the investigation of his gastric symptoms showed evidence of a biliary fistula between either the gall bladder or the common duct and the duodenum. Physical condition did not warrant operation and the patient is being followed in the out-patient department.

CASE 5

Mr. A.C., aged 61. Admission complaints were pain in the right upper quadrant for one month; gaseous eructations for four to five years. The only serious episode in the past was what had been described as a heart attack in 1936, after which he was in bed for three months.

He last felt well two years ago; at that time he was seized with a severe pain on the right side of the back, in the mid-lumbar region and radiating to the right shoulder. This attack lasted 4 to 5 hours; no jaundice appeared. The next attack was a year ago, it was very similar to the previous one, the pain radiating from the right upper quadrant to the mid-lumbar region and lasting 5 to 6 hours. His appetite has always been poor, and he has not been able to eat fatty foods. No blood in the stool, but they have been very light during the attacks of pain.

Patient was admitted with a third attack of pain, more severe than the last. Acute stage lasting 6 hours. The pain began in the epigastrium and radiated to the right, no retro-sternal pain. He vomited and perspired; no jaundice observed but the urine became dark.

Examination: obese; blood pressure 128/72; abdomen soft and flaccid, no masses felt, there was tenderness below the right costal margin at the tip of the ninth cartilage. A flat plate was made of the abdomen, which showed no evidence of biliary or renal calculi, no abnormal soft tissue or gas shadows. In 1939 an oral iodeikon series was done and the dye showed very good concentration in the gall bladder; within the gall bladder were two movable, non-radio-opaque shadows, apparently cholesterol stones, of medium size. This examination was repeated one year later, after the last attack of pain. No shadow of the gall bladder was visualized. This examination was repeated one week later with still no visualization. This was taken to be due to obstruction of the cystic duct, probably by the stones previously demonstrated.

Cardiac disease was excluded on the basis of the elapsed time since the initial episode, on the physical findings and on the electrocardiographic findings which were normal for his age. Urea nitrogen 14 mgm. %; creatinine 1.59 mgm. %; van den Bergh 0.2 units; sugar (fasting) 0.116 % urobilinogen present in less than 1/10 dilution. Blood count, 4,450,000 red cells, 7,600 white cells, hemoglobin 90%.

At operation the fundus of the gall bladder was found to be fused with the anterior surface of the stomach, close to the pylorus. On further exploration this proved to be a fistulous opening. The gall bladder was concealed by many adhesions, and contained two large calculi. The gall bladder was removed and the fistulous opening into the stomach closed. The post-operative course was uneventful.

CASE 6

Miss H.M., aged 39. Patient was admitted with complaints referable to the rectum and to the right upper quadrant. There was loss of appetite and loss of 35 lb. weight in the past year. The past history revealed an attack of cholecystitis with an associated pleurisy in 1922; since then she had an appendectomy and operation for hemorrhoids.

Prior to 1922 patient was well; since then she has had frequent attacks of pain in the right upper quadrant. Physical examination revealed tenderness over the gall-bladder region, no masses were felt.

Films were made of the gall-bladder region following the intravenous administration of dye. The gall-bladder was not visualized. This was followed by a barium series. In the immediate films there was seen a projection of opaque material in the region of the first portion of the duodenum. This was considered to be due to a fistula communicating with the gall-bladder and extending into the first portion of the duodenum. This opaque material was not present in the original gall-bladder examination and was not seen at the screen examination. At six hours there was a large rounded collection of barium in the region of the first portion of the duodenum and the gall-bladder; smooth in outline and considered to be barium in the fundus of the gall-bladder. This rest was still present after 24 hours. The remainder of the examination was normal.

Operation: on isolating the gall-bladder and duodenum, an anastomosis was found between the ampulla of the gall-bladder and the second portion of the duodenum. The gall-bladder appeared to be normal. There was a large mass in the duodenum thought to be an ulcer. A subtotal gastrectomy was done to short-circuit the food from going into the duodenum. Nothing was done to the gall-bladder at this time.

The patient was discharged in good condition. In March, 1941, she was readmitted complaining of pain in the gall-bladder region, loss of 29 lb. in weight, and loss of strength. Since the operation one year previously she had had pain in the right upper quadrant coming on in the afternoon and evening. She also complained of colicky pains and frequent chills and bouts of fever. There had also been swelling of the arms and legs thought due to avitaminosis. On physical examination there was pain, tenderness and rigidity in the right upper quadrant. No jaundice, bile was present in the stool.

Operation: the gall-bladder was isolated and separated from the duodenum. The fistulous opening in the duodenum was then closed and the gall-bladder removed. There were numerous small stones in the gall-bladder.

The patient did well after the operation and rapidly gained weight. The subsequent course has been good.

SUMMARY

Six cases of internal biliary fistulae have been reported, and the probable pathogenesis outlined. It is interesting to note that the only cases diagnosed clinically were by the roentgen ray, these being demonstrated by means of a barium meal. The presence of gas in the gall bladder and hepatic ducts was a constant finding in one case. The gall bladder was at no time visualized. Garland and Brown¹¹ have recently reviewed the cases of internal biliary fistulae diagnosed roentgenologically; they total 90 cases. Thus the condition should be kept in mind by the radiologist in his gastro-intestinal examinations; especially where there are abnor-

mal gas shadows in the right upper quadrant.

I have also presented some of the possibilities which may result from temporizing or delay in the treatment of cholelithiasis. The so-called "silent" stone is also not without its dangers, as exemplified by the ease of intestinal obstruction.

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NON-HYPOGLYCAEMIC (ALLERGIC) INSULIN REACTIONS*

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SINCE the earliest use of insulin for the treatment of diabetes various reactions unrelated to the specific physiological effects of the hormone upon the blood sugar and the carbohydrate metabolism have been noted. These non-hypoglycaemic reactions consist usually of localized or generalized cutaneous vascular manifestations; rarely, they take the form of more spectacular anaphylactoid phenomena.

Originally, such untoward effects were attributed to impurities of a protein nature in the earlier preparations of insulin. However, with the use of more highly purified products, *e.g.*, crystalline insulin, allergic reactions continued to occur. They vary in intensity from a mere transitory annoyance to a serious handicap of the planned therapeutic management of the patient.

Experimental as well as clinical evidence, points to the fact that insulin *per se*, because it is a protein, possesses allergenic properties with the factors of organ specificity and possibly species specificity influencing the antigenic tendencies of liquid preparations. Considering the large number of persons who use insulin, regularly or irregularly, the incidence of major allergic complications is comparatively low, which is suggestive of an individual susceptibility to the hormone on the part of those who are affected adversely. The various aspects of insulin hypersensitivity have been reviewed by several authors.¹⁻⁸

The incidence of allergic reactions to insulin,

as reported by different observers, has varied widely. For instance, Lawrence,⁹ in 1925, said that 30% of his insulin-treated diabetics suffered some degree of trouble from the injections. In more recent groups of cases, figures ranging from about 15% to less than 1% have appeared.^{1, 4, 5} According to my experience, so-called insulin allergy develops in approximately 5% of insulin-treated diabetics.

CUTANEOUS REACTIONS

Localized cutaneous reactions.—That minor, more or less troublesome, irritations limited to the sites of injection and not due to faulty technique, occur sometimes at the beginning of insulin therapy is well known to those engaged in the treatment of diabetes. The impression is that such reactions have been more frequent since the advent of protamine insulin than formerly. But in this regard it is noteworthy that Kern and Langner¹⁰ demonstrated that the local reactions probably are not due to the protamine compound, but, rather, are related to the more prolonged action of the antigen (insulin) owing to its delayed absorption. Women, especially the obese, appear to be more susceptible to the local cutaneous reactions than men.

If the patient can be encouraged to persevere with the itching, burning and soreness which characterize these reactions, allayed as they may be by local applications, the prediction is that the symptoms will disappear spontaneously with the continuance of the treatment, presumably as a result of the patient desensitizing himself,

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or perhaps by the acquirement of a local tolerance, as illustrated by the following record:

CASE 1

A woman, aged 53, a subject of hay fever, developed symptoms of diabetes mellitus in December, 1939. She entered the hospital in January, 1940, with marked glycosuria, ketonuria, and a blood-sugar concentration of 417 mgm. %. Five days after the beginning of insulin therapy, at which time she was receiving 16 units of crystalline zinc and 24 units of protamine zinc insulin daily, the sites of the injections became reddened and itchy. With persistence of the treatment the reactions became more pronounced, each injection of the insulin causing an area of erythema about 8 cm. in diameter, associated with oedema, induration and burning pain. The symptoms were ascribed to some extent by soothing applications and the administration of insulin was continued. By the 12th day the irritation was much less marked and the patient left the hospital taking 12 units of crystalline zinc and 16 units of protamine zinc insulin as two separate injections daily, a dosage which she was able to tolerate subsequently without any discomfort whatsoever.

Generalized cutaneous reactions.—Of more serious moment is the development of generalized cutaneous complications such as urticaria, oedema or pruritus which may necessitate a decision between the abandonment of insulin therapy or an attempt to desensitize the patient. The conditions affecting the skin may be accompanied by respiratory difficulties or gastrointestinal symptoms.

CASE 2

A woman, aged 69, whose diabetes was discovered in 1934, gave no history of previous allergic manifestations. She was indifferent as to dietary regulation until an abrasion occurred on a foot in January, 1940. This condition healed in spite of imperfect control of the diabetes. She had not received insulin prior to subsequent hospitalization in March, 1941.

On admission, the blood sugar was 206 mgm. %; glycosuria was pronounced without ketonuria. Along with a specified diet, protamine zinc insulin, 10 units each morning, was prescribed. While this kept the fasting blood sugar concentration at the desired level, glycosuria persisted during the day and there was mid-morning hyperglycemia. Consequently, in addition to the protamine zinc insulin, 10 units of crystalline zinc insulin were given. This treatment was tolerated well for about one week; then the patient began to complain of burning and itching at the sites of the injections. Each of the tender, hot, reddened areas persisted for about 48 hours. From the standpoint of the diabetes, the response to the treatment was quite satisfactory. The blood sugar values became normal with an adequate food intake. The patient was told that the local reactions probably represented but a transitory complication and, accordingly, she was advised to endure the treatment, which she did under protest. Instead of disappearing, the local reactions became almost intolerable at times. However, intent on adhering to the prescribed stipulation, she continued taking insulin at home. Twenty-eight days after receiving the first injection her body became covered with giant urticarial wheals. The mucous membranes of the mouth and throat were swollen also and she was in great distress, so much so, that her readmission to the hospital was recommended. The administration of insulin was discontinued and, after three days, during which time she received the usual remedies for urticaria and in ad-

dition was given histaminase (torantil) orally, the rash disappeared. Intracutaneous tests with both protamine zinc and crystalline zinc insulin gave strikingly positive reactions.

Desensitization of this patient was not undertaken since her diabetes has been reasonably well controlled on a strict dietary regimen without the aid of insulin.

ANAPHYLACTOID REACTIONS

Still more disconcerting are the anaphylactoid reactions which, fortunately, are of rare occurrence. The usual story is that the patient received insulin at some time; its use was discontinued; then, with the beginning of another course of insulin treatment a systemic reaction with prostration supervenes.^{1, 2, 11} Recently, Hinko, Fenton and Balberor¹² described an anaphylactic response in a patient with schizophrenia during an initial course of shock therapy with gradually increasing doses of insulin.

Another example of the anaphylactic type of allergic reaction due to insulin in a diabetic is recorded below:

CASE 3

A woman, aged 58, with diabetes of 15 years' duration, entered the hospital on account of a gradual failure of vision. The presence of glycosuria, ketonuria and a blood-sugar concentration of 232 mgm. % on admission, was regarded as sufficient reason for the administration of 8 units of crystalline zinc insulin. Within five minutes following the injection, the patient was in a state of collapse and apparently unconscious. She became cyanosed and literally pulseless, exhibited respiratory distress and the skin had a cold clammyness. There were vomiting and involuntary passage of the contents of the bladder and bowel. The systolic blood pressure was about 80 mm. Hg. No cutaneous lesions developed.

Following the administration of adrenalin and the application of other supportive measures the condition of the patient gradually improved. In two hours she looked and felt much better, but it was not until about 18 hours had elapsed that she felt anything like her previous self.

The history, complete details of which were obtained subsequently, revealed that this patient, whose diabetes was discovered in 1926, spent two weeks, in 1929, at the New England Deaconess Hospital, Boston, under the care of Dr. E. P. Joslin. While there, glycosuria ranged from 3.2 % to 0 and the blood-sugar values (fasting) varied from 220 to 170 mgm. %, and she received regular insulin two or three times daily up to as much as 32 units. At the time of her departure, she was getting 15-0-12 units.

At home these doses were reduced gradually and, in the course of time, her diabetes was controllable, apparently without the aid of insulin. In 1938, owing to a break in carbohydrate tolerance, injections of insulin were resumed. These evidently caused unpleasant symptoms, light-headedness and a sensation of "walking on air". Consequently, the use of the insulin soon was abandoned.

In 1940, the patient contracted an infection, followed by gangrene, of a toe. On account of this complication, she was taken to a hospital where incision and conservative amputation were performed with a satisfactory result. At that time, an attempt was made to reduce the hyperglycemia and promote healing by the administration of insulin. A single dose of 5 units of unmodified insulin caused almost im-

mediately a condition of shock from which it took several hours for recovery to occur.

In the light of this knowledge regarding the patient's previous experiences with insulin, it was obvious that a condition of insulin intolerance existed. No other history of allergy was elicited. Intradermal tests, using varying concentrations of insulin, were performed by Dr. G. R. Collyer. Both the solution of zinc insulin crystals and protamine zinc insulin in a dilution of 1:20 yielded definitely positive reactions accompanied by slight but definite constitutional symptoms. Of other test proteins the only ones showing anything suggestive of positive reactions were veal (slight) and beef muscle (questionable).

The patient was desensitized to insulin in the following manner. Beginning with 0.1 c.c. of the solution of zinc insulin crystals diluted 1:200, gradually increasing doses were given every other day for 10 days, then daily until 0.6 c.c. of a 1:20 dilution was reached. A change was made then to protamine zinc insulin. Two weeks later, the patient left the hospital receiving 20 units of this insulin daily without untoward effects, and has continued to take this dosage with marked benefit as regards her general well-being consequent to the improved state of her diabetes.

DISCUSSION

As the population of diabetics, and so the users of insulin, increases, the number of allergic incidents due to insulin may be expected to become more frequent. Perhaps some of the as yet unexplainable conditions, including the lipodystrophy due to insulin, which affect diabetics may prove to be related to acquired hypersensitiveness. The chemical nature of insulin makes it an antigenic substance. Unquestionably, an individual can become sensitized to insulin and as a result suffer a condition comparable to serum sickness. Or another type of acquired sensitivity may develop in a patient who has received insulin and discontinued its use, a subsequent injection of the hormone then being capable of provoking anaphylactic shock. Experimentally, Bernstein and his associates¹³ as well as others, have produced anaphylactic responses in guinea pigs by the injection of insulin three and six weeks after the animals had been sensitized to the hormone by previous injections.

Apparently the development of a state of hypersensitiveness to insulin in a diabetic patient does not modify to any marked degree the influence of the hormone upon the blood sugar. *A propos* of this, Wassermann and his collaborators¹⁴ wrote as follows: "It is of interest to note that in spite of the fact that specific antibodies can be produced by the administration of insulin, the physiological response to insulin is apparently not impaired. Although antibodies can be formed, they do not behave as insulin-antihormones". Nevertheless, certain cases, such as described by Allan and Seherer¹⁵ and others, have been observed in which a state

of insulin hypersensitiveness appeared to be related to a condition of insulin resistance.

Apart from the occasional association of insulin allergy and the biochemical unresponsiveness to insulin therapy, no fatalities have occurred, apparently, as a direct result of anaphylaxis. Nevertheless, the implication is clear. Any suggestion that a patient may be sensitive to insulin should never be disregarded; rather the indication is to proceed with caution, especially when it is a matter of the resumption of insulin therapy in one who has sustained an interruption of the treatment.

As mentioned above, the diabetic with a hypersensitiveness to insulin may desensitize himself, or difficulties may be overcome by the discontinuance of the use of insulin, providing it is not essential for the treatment of the patient. Some benefit may be derived from reducing the dosages, or the number of injections, or by changing to a more concentrated form of insulin. A change to an insulin of a different biological source would not be expected to be very helpful, except in rare instances, since the sensitizing agent rests in the molecular structure of the insulin itself. When, however, the adequate treatment of the patient depends upon insulin, a program of artificial desensitization must be considered. The attempts to desensitize patients who exhibit severe generalized reactions are not always successful, as revealed by Allan and Seherer² and Joslin *et al.*¹

Various methods for the desensitization, or hyposensitization, of persons against insulin have been described. As pointed out by Harten and Walzer⁵ these fall into two main groups, namely, slow and rapid procedures. Through the courtesy of Dr. E. P. Joslin¹⁶ I am privileged to refer to the method which is in use now at the New England Deaconess Hospital as follows: One unit of insulin is diluted 1,000 times, then 1/1,000 of a unit is given before breakfast, 2/1,000 before the noon meal, 3/1,000 before the evening meal and 4/1,000 on retiring. The next day the doses are increased similarly. Often one can proceed more rapidly, skipping and doubling the quantities, so that, generally, in three or four days the patient will be tolerating a reasonable amount of insulin.

SUMMARY

1. Minor grades of local cutaneous reactions occur in some diabetics early in the course of insulin therapy. In the majority of cases the

symptoms disappear spontaneously with the continuance of the treatment.

2. More pronounced allergic reactions with associated generalized urticaria also occur, necessitating desensitization of the patient or the discontinuance of the insulin treatment.

3. Rarely, anaphylactic shock supervenes upon the resumption of insulin injections after the patient has sustained an interruption of insulin usage.

4. Clinical examples of these various allergic manifestations due to insulin are presented.

5. A history of insulin sensitivity should not be disregarded, because such may be an indication for cautious procedure with respect to the continuance or resumption of insulin therapy.

6. Desensitization is often but not always successful.

I am indebted to Dr. J. G. MacDougall and Dr. K. A. Mackenzie, of Halifax, Nova Scotia and Dr. E. P. Joslin, of Boston, Mass., for information concerning the patient designated as Case 3.

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SILENT BRONCHOPNEUMONIA*

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INTRODUCTION

ROUTINE radiography of the chests of recruits for the Canadian Forces, has, as might be expected, provided useful information as to the nature and frequency of intrathoracic diseases of various kinds.^{1,2,3} This has been most interesting and informative when, as is often the case, important injury has been made apparent which has escaped detection by other methods of examination.

That this is true for chronic pulmonary and vascular disease is of course common knowledge. That acute inflammatory pulmonary disease may on occasion be detectable only by x-ray examination is perhaps less generally recognized, but accumulation of experiences shows that this is the case.

Since the outbreak of war 96 cases of acute

pulmonary exudation have come under observation in this military district, which would presumably have escaped detection if it had not been for the "accident" of radiographic examination resulting from war conditions. These may be termed silent, concealed, or undiagnosed bronchopneumonias. That the pneumoma-like lesions to be described are exudative and inflammatory in character rather than sterile regional atelectasis as might otherwise be suspected, is indicated by the fact that the erythrocyte sedimentation rate was, in all the cases examined, well elevated throughout the existence of the shadow.

DESCRIPTION OF THE LESIONS

1. *Clinical picture.*—During the routine radiography of the chests of applicants for admission to military services in this district, a number of films appeared showing bronchopneumonia-like shadows of mild to substantial extent and intensity, occurring in any part of the lung fields. Investigation showed that the persons concerned were not ill, but that the majority admitted a

* From the Mara Laboratories at the Queen Alexandra Sanatorium, London, Ontario. Courtesy Staff of Westminster Hospital, London, Ont.

Presented in part before the Medical Section of the Royal Society of Canada at Kingston, Ont., May, 1941.

Presented in part before the North Waterloo Medical Society at Kitchener, Ont., March, 1942.

present or recent "cold", or "flu", etc. Occasional cases were entirely silent in this respect. No crepitations were heard by auscultation, but respiratory lag of the affected side was usual. In the majority of cases, it was possible to follow the lesion clinically and radiographically to its termination. In these, temperature elevation in this and subsequent days was usually absent, but was sometimes low-grade. Most of the cases had erythrocyte sedimentation tests and this without exception was well elevated (35 to 115 mm. with 200 mm. tube). Leucocyte counts in a few cases examined were always elevated (12,000 to 35,000). The radiographic shadows more or less completely disappeared, and the sedimentation rate became normal in all cases in from about one to five weeks. Many of the lesions were apparently in a late phase of recession when first seen. A number of cases were discovered by radiography brought about by a variety of other "accidental" reasons as reflected in the case histories that follow.

As before noted, the majority stated that they had, or recently had had, "a cold", "bad cold", "flu", "sore throat" or "attack of bronchitis", etc., usually for two or three weeks prior to the examination. Occasional cases had previously been sufficiently ill and toxic to leave their work and remain in bed. A common story was to admit a chest cold with improvement, followed by relapse on return to duty.

2. *Anatomical characters.*—Fifty-four per cent of the lesions occurred on the right side of the thorax. Seventy-six per cent were situated entirely below the level of the lower border of the hilus or third costal cartilage. These would be predominantly, but not necessarily, in a lower lobe. Eight per cent of the lesions occurred largely or entirely above the level of a second costal cartilage, and these would necessarily be in an upper lobe. The remaining 16% occurred in the mid lung zones between these levels. Without localizing râles or lateral films, it could not be determined whether they were in upper or lower lobes of the lungs. Many of these occurred in the region immediately surrounding the hilus. Thus pneumonic lesions occurred in the upper half of the thorax (24%), perhaps more commonly than might be suspected from clinical identification alone. The lesions ranged from mild to substantial in extent and intensity, but no highly intense or extensive pneumonias fell into this "silent" category. On the average the lesions were probably of lesser

extent and density than the simultaneously occurring clinically manifest bronchopneumonias, but the difference was not gross, and the silent group were definitely not characterized as being small or slight lesions. In four cases the lesions were bilateral, and in two cases repetition of a silent pneumonia was encountered on the opposite side.

The distribution of the shadow tended, as is usually the case in manifest bronchopneumonias, to occur within a cone-shaped segment, with apex towards the hilus, suggesting that it is dependent upon the course of a major-sized bronchus; that is, the lesions were not, as a class, of a heterogeneous patchy distribution but were regional or localized masses. Their duration was in general shorter than that of clinically manifest bronchopneumonias, but this is sufficiently explained by the fact that many were "discovered" only at an apparently late stage of their course. The seasonal incidence was the same as that of the parallel cases of manifest disease. To summarize, we were unable to detect anything in the anatomical picture by which these silent bronchopneumonias could be differentiated from the clinically manifest group.

Some residual abnormal pulmonary or pleural shadow, slight or marked, remained after resolution of the pneumonia in 38% of the cases. In two cases, the presence of bronchial dilatations was subsequently proved by the use of iodized oil. However a considerable proportion of the lesions were encountered in recruits without previous x-ray films, and it cannot be proved for the group in what proportions the visible chronic changes respectively antedated and resulted from the pneumonia in question. There is however sufficient evidence to show that chronic basal injury of the bronchiectatic type, undoubtedly can and does result from silent or unidentified bronchopneumonias as well as from clinically manifest cases of the disease.

It must be realized that there is no hard and fast dividing line between "silent" and clinically manifest cases of bronchopneumonia. Cases have here been called "silent" in the absence of conspicuous toxæmia, of blood-spitting or chills, or of crepitant râles at the time of the first examination, that is, in the absence of the textbook landmarks of bronchopneumonia. Bronchopneumonia might have been suspected or tentatively diagnosed in some of these cases, depending upon the predilections of the ex-

aminer, but without radiography there is no way of clearly differentiating these from the coincidentally occurring and clinically more alarming cases of acute respiratory infection, in which no pneumonia was made apparent by the films. Just as for pulmonary tuberculosis we have come to know that a clinically and physically positive picture means extensive and not early disease, so frequent radiography of respiratory acuties makes it clear, that only substantial and favourably placed bronchopneumonias may be identifiable by the conventional signs and symptoms and that without radiography a multiplicity of other lesions must remain undiagnosed, unproved or merely suspect.

3. *Representative case histories.*—Before proceeding to a discussion of the nature, significance and possible consequences of this type of pulmonary disease we present a few abbreviated case histories to illustrate the nature of some of the incidents by which such lesions came to light.

CASE 1

E.G., aged 21, Army, reported for economic reasons. Ambulant treatment for "sore throat" two weeks previously. Denied cough, physical signs negative, fances slightly dusky. Pulmonary disease not clinically suspected. Routine chest radiography showed patchy bronchopneumonia over lower two-thirds of the right lung field. Bed treatment; no temperature; sedimentation rate 55 mm. in 1 hour (200 mm. tube), lesion disappeared in ten days; sedimentation rate became normal. Presumably an unidentified streptococcus bronchopneumonia, masked by sore throat.

CASE 2

D.J.R., aged 47, last war pensioner for chronic apical tuberculosis. At routine pension examination progress regarded clinically as satisfactory; no change in symptoms. Inspection of new film neglected for thirty days, when intense bronchopneumonia seen at right base. Repeat film showed the shadow to have completely disappeared.

CASE 3

Mrs. E.A., aged 28, hospital maid, influenza-like illness, pain, temperature elevation, no cough. Chest radiographed because hospital employee; presumably not have been x-rayed under other conditions. Four centimetre intense localized bronchopneumonia-like shadow adjacent to left hilus. Differential diagnosis between tuberculosis and acute bronchopneumonia. Shadow disappeared in fifteen days. Undiagnosed bronchopneumonias were relatively common in this region, which in part explains the absence of physical signs.

CASE 4

E.M., aged 15, school girl, sent to travelling clinic by teacher because of winter cough. Negative physical signs. X-ray of chest as tuberculosis suspect showed moderately intense bronchopneumonia right base and elevation and deformity of diaphragm. Bed treatment; no temperature elevation; shadow markedly lessened in density and diaphragm partly replaced in ten days. Not followed further.

CASE 5

D.W., aged 65, last war soldier collapsed on street; vascular accident suspected. Chest radiograph showed intense pneumonia right upper lung field, not identifiable by physical signs. The shadow disappeared completely in eighteen days.

CASE 6

Mrs. E.C., aged 63, hospital staff, sudden shortness of breath, dry cough, no elevation of temperature, sedimentation rate 75 mm. X-ray showed apparently consolidated and partly collapsed right lower lobe. First diagnosis primary bronchogenic carcinoma with obstruction. Shadow disappeared and sedimentation rate became normal in two weeks. No recurrence in more than two years. Presumably therefore an exudative obstruction.

CASE 7

J.D., Air Force, left shoulder x-rayed for pain. Moderately intense bronchopneumonia visualized in adjacent included left lung field and confirmed by repeat chest radiograph. Crepitant râles then heard anteriorly. No cough, sedimentation rate 45 mm. His lesion disappeared in eight days.

CASE 8

J.B., aged 24, applicant for enlistment. History of left basal pneumonia four months previously with clinical recovery. Impairment and lag over left base; no râles. X-ray showed substantial left basal shadows interpreted as fibrosis and pleural thickening, and rejected for military service. Reapplied for enlistment six months later, and shadow originally taken to represent chronic injury had completely disappeared, i.e., must have been an acute exudative lesion masked by history of former pneumonia.

CASE 9

R.B., aged 32, Air Force, clinically and radiographically identified right basal bronchopneumonia with hospitalization and recovery. Final x-ray preliminary to return to duty showed that the right-sided pneumonia had resolved, but a new otherwise unsuspected bronchopneumonia had appeared in left mid lung field. This ultimately resolved.

CASE 10

W.McK., aged 22, Army, hospitalized preparatory to appendectomy. Fever, no cough. Routine chest radiograph showed fairly intense right upper lobe bronchopneumonia. No râles. Nearly complete resolution in eight days.

CASE 11

E.D., aged 23, Army, undiagnosed central abdominal pain; fever. No cough or other pulmonary symptoms or signs. Chest x-ray showed moderately intense left basal bronchopneumonia. Resolution in two weeks.

CASE 12

Mrs. D.P., aged 27, proved bronchiectasis. X-ray showed development of apparently typical tuberculosis and cavity in previously clear first interspace. Lesion disappeared completely in 16 days. This type of episode has been seen a number of times in both military and civilian practice.

PREVIOUS DESCRIPTIONS

The observation of clinically silent bronchopneumonia has been formerly reported. Ramsay and Scadding⁴ record 29 cases of the kind identified in two years in a tuberculosis dispensary service. They review reports of smaller numbers of cases from the literature under such

names as mild, benign, abortive, atypical, ambulatory, pseudo and symptom-poor pneumonia, with pneumonitis apparently the most popular. The description of the clinical picture by these authors, together with their six illustrations of representative lesions, leaves no doubt that they are describing the same class of disease as here reported. They record that the lesions in their series had completely absorbed after six to eight weeks, this being the interval at which the second radiographs were prepared. From the experiences and observations of our series we agree entirely with the conclusion of these authors that "... the localized consolidations probably represent aspiration pneumonias arising in the course of catarrhal infections of the respiratory tract, and are of frequent occurrence". No previous observers however seem to have established the exudative nature of the lesion by parallel erythrocyte sedimentation tests.

Gallagher⁵ also collected references to a number of obscure and transient pulmonary lesions described as atypical bronchopneumonia, pneumonia of unknown origin, interstitial pneumonia, virus pneumonia, pulmonary infection, etc., and conclude that these should be called "pneumonitis", "to distinguish this entity from other clearly recognized forms of pneumonia". Ramsay and Seadding however conclude from the evidence that the Gallagher cases are identical in kind with those which they reported.

The opportunity afforded by military conditions of making frequent radiographic observations throughout the course of many cases of manifest bronchopneumonia, throws possible light on the reason for this polymorphism of names and ideas. When bronchopneumonia is radiographically visualized reasonably early in its course, the diagnosis is usually obvious, and doubtful cases are the exception. However, the anatomical picture of resolving bronchopneumonia is much less clearly defined. A point is reached especially in the later stages of resolving known bronchopneumonia, in which the radiographic picture might be described as comprising some or all of the following types of shadow, namely, a thickened and woolly appearance of the regional trunks, ovoid high lights along the course of these trunks, indefinite or debatable patchy shadow, and light diffuse shadow, with or without displacement or deformity of adjacent organs. Not infrequently such shadows are indistinguishable from those

reflecting permanent post-pneumonic damage and bronchiectasis, until subsequent films show whether or not resolution follows.

When less than characteristic transient pulmonary shadows are encountered in the absence of a typical history of pneumonia, there naturally results a fear of interpreting frank pneumonia, and an incentive to diagnose and name something other than the garden variety of bronchopneumonia. Ramsay and Seadding however conclude that these indeterminate types of lesion are probably identical with those which they describe as "benign pneumonias". Frequent radiography of all classes of respiratory acuties in this centre affords no evidence or suggestion that this type of shadow arises in any other way than as a sequel of acute regional bronchopneumonia. We therefore recommend that until or unless evidence of a different anatomical or etiological pattern of acute pulmonary exudation is demonstrated, all visible transient lesions had better be regarded as, and named, regional or broncho-pneumonia.

ETIOLOGY

Other authors^{4,5} have regarded relatively silent bronchopneumonias as probably the result of low virulence of the causative organism. This may well be the case but no bacteriological investigations are recorded. No useful number of bacteriological examinations were obtained in the series here reported.

However, serial radiography during the course of cases of clinically manifest bronchopneumonia reveals another possibility. During the course of known or manifest bronchopneumonia a time or stage is reached when the temperature elevation and symptoms have subsided, the râles (if any), have disappeared, and the physician interprets anatomical cure and the commencement of convalescence. However, in some 300 cases of manifest bronchopneumonia which were followed by serial radiography in this district, it was found that when the thorax was radiographed at this stage of apparent clinical cure, the greater part of the pneumonic deposit was still present with surprising frequency. This was the case whether or not chemotherapy had been exhibited. Also under these circumstances, the erythrocyte sedimentation rate was invariably well elevated, although less high than at the peak of the illness. In the subsequent ten to twenty days the exudate disappeared in the usual way, closely

paralleled by subsidence of the erythrocyte sedimentation rate. Presuming that the febrile stage under these circumstances represents the development of immunity to the micro-organisms concerned, these experiences indicate that the completion of removal of exudate and dissipation of atelectasis may, and in fact usually does, *substantially postdate the establishment of specific immunity.*

This observation provides an alternate hypothesis to that of merely low-grade virulence, as an explanation of "silent" bronchopneumonia. As above recorded, the majority of these cases of silent or concealed bronchopneumonia admitted an antecedent respiratory infection sometimes with feverishness, toxæmia and relapse. If and when such illness represents non-diagnosed bronchopneumonia, and survey radiography happens to strike in the post-toxic stage, we have here all the conditions necessary for the production of "silent pneumonia" as here defined; that is, there is intrapulmonary exudation as indicated by the radiograph and sedimentation rate, but without the symptoms and physical signs customarily associated with this condition. Thus it may often be that so-called "silent" bronchopneumonias are merely cases in which the diagnosis was accidentally first made in the post-toxic stage, but before the completion of resolution of exudate.

PRACTICAL IMPORTANCE OF SILENT BRONCHOPNEUMONIA

For a number of reasons this situation of probably frequent undiagnosed or silent bronchopneumonias may be of considerable practical importance.

1. In the first place, because of the frequency with which this type of lesion has come to light by the accident of survey radiography, it follows that such disease may, and probably does, occur with more or less regularity in the civilian population. These experiences show that any respiratory acuity however mild, and even symptoms interpreted as extrathoracic in origin, may in reality reflect a bronchopneumonia not identifiable by physical signs or by the conventional clinical picture. In more severe respiratory acuities also, unless distinguished by chill blood-spitting or crepitant râles, it is impossible to differentiate cases having an underlying bronchopneumonia, from pneumonia-free cases such as are popularly labelled "flu".

2. In the absence of radiography it follows

that it is safest to regard and manage all cases of intercurrent respiratory disease as possible cases of bronchopneumonia. Confinement to bed even in mild cases until all symptoms have permanently subsided confirms the public health viewpoint. If it is not regarded as practical to radiograph the chests of all such persons when symptoms have subsided, the clinician has a less expensive guide to exudation in the erythrocyte sedimentation test. A normal sedimentation rate will indicate that it is safe to return to employment, while an unexplained elevation indicates the need for further exploration, radiography, or further waiting. Such precautions would seem to be indicated to lessen the probability of relapse, or occurrence of complications including bronchiectasis.

3. A further deduction of great practical importance follows from the recognition of relatively silent or undiagnosed bronchopneumonia as a probably common occurrence. It is the trend of thought to regard bronchiectasis, and the still more common bronchiectasis-like chronic basal disease, as solely a sequel of acute pneumonia, and not a development of chronic bronchitis (6 with references). Although in the presence of bronchiectasis a history of pneumonia or pneumonia-like episode is obtainable in from perhaps one-half to two-thirds of cases, there is an important residue in which no such history can be elicited. This author elsewhere has concluded that these are probably also of pneumonic origin, because of the absence of any other clinically, physically, and pathologically sound explanation of this class of disease.⁶ The demonstration of the not uncommon occurrence of undiagnosed bronchopneumonia, and of the fact that these may leave visible post-resolution damage in an important percentage of cases (ante), may well then be the explanation of this historical missing link.

SUMMARY

1. It is shown from experiences with survey radiography that clinically silent and undiagnosed bronchopneumonia is of relatively common occurrence.

2. It is shown that the clinical management of all respiratory acuities however mild should take cognizance of the fact that concealed bronchopneumonia is possible.

3. It is shown that bronchiectasis and bronchiectasis-like disease may result from silent undiagnosed bronchopneumonia in the same way

that these are known to arise from manifest and identified bronchopneumonia.

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RÉSUMÉ

La broncho-pneumonie des soldats est souvent latente et peut n'être parfois révélée que par la radiographie. Alors le test de sédimentation globulaire est positif et la leucocytose est souvent élevée. L'aspect clinique est très vague et l'anamnèse ne rapporte souvent qu'un rhume ou un peu de toux. Le sommet du cône de l'ombre radiologique tend à se retrouver vers le hile. Des séquelles bronchectasiques ont été observées. Il s'agit de cas d'infection très peu virulente ou de dépistages à la phase de résolution. Il faut admettre que cet état doit être assez fréquent dans la vie civile. Il faut traiter ces malades activement afin de leur éviter la complication si fréquente de la bronchectasie. JEAN SAUCIER

MODERN OINTMENT BASES*

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THE purpose of this paper is an attempt to clarify for dermatologists the chemistry of modern ointment bases, the knowledge of which we owe to the industrial and cosmetic chemists.

The habit of rubbing substances on to the skin dates back before recorded history. The fat of killed animals when applied to the skin and hair afforded a certain protection against the elements. Fat, too, was originally used as a detergent when soap was quite unknown.

The refining of mineral oils furnishes various residues. One is petrolatum, a tough, sticky and greasy substance, absolutely inert, not affected by air or water, nor by acids or alkalis. This seemed to be an ideal vehicle for the external application of drugs. Petrolatum displayed no incompatibilities and did away with the disagreeable features of animal and vegetable fats and oils which tended to rancidity. For many years, it was a favourite ointment base, and only after prolonged use were its many disadvantages discovered: (1) petrolatum is not absorbed by the skin and does not mix with secretions or exudations; (2) the incorporated drugs do not get into intimate contact with the tissue, and therefore the maximum effect is not attained; (3) it prevents evaporation of moisture and access of air to the skin, and retains secretions; (4) difficulty is encountered in removing it from clothing.

In recent years, dermatological opposition has been increasing against the general use of mineral oils in ointment bases. Goodman and Wimmer¹ have even gone so far as to demand the reinstatement of animal fats in the 12th issue of the U.S.P. to completely replace petrolatum in ointments and pastes. While sharing their antagonism against the latter, we do not believe that it is necessary to revert to the evil-smelling concoctions of our forefathers, because today new synthetic substances are available which are as stable as petrolatum and more effective than the natural fats or oils. We are on the threshold of "elegant" pharmacy in dermatology.

What are the requirements for an ideal vehicle?—(1) It should be chemically inert, that is—(a) it should not irritate the living tissue; (b) it should not react with drugs—in other words, show no incompatibilities; (c) it should not decompose through contact with air, water or secretions; (2) it should bring the active drug into intimate contact with the diseased tissue; (3) it should create such conditions on and within the epidermis, as we wish to produce, particularly as regards the pH, the moisture content, and the fat content; (4) it should be easy to prepare in a constant composition; (5) it should be easy to remove, preferably with plain water, from the skin and clothing.

What exactly is an emulsion?—An emulsion is a paradox. It is the intimate mixture of two liquids which are not miscible with each other. It consists in the dispersion of minute droplets

*Read before the Section of Dermatology and Syphilology, Canadian Medical Association, at the Seventy-third Annual Meeting, Jasper Park, Alta., June 17, 1942.

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of one liquid in the other. Normally, such a dispersion will persist only for a short time, because the individual droplets tend to unite into drops, the drops of the heavier liquid sinking to the bottom, until finally the two liquids have separated into two distinct layers or, to use the physical term, phases. The stability of such a dispersion can be increased in various ways, for instance, by increasing its viscosity. The thicker it becomes, the more difficult is it for the droplets to reunite, and thus for the two phases to separate. Emulsions which separate very slowly are called permanent; one of the most striking examples of a permanent emulsion is milk.

If the two phases are oil and water, we have to distinguish between two forms of emulsions whose properties are entirely different; emulsions of oil in water, and emulsions of water in oil. The main characteristic of an oil-in-water emulsion is that it can be diluted to a certain degree with water without breaking down, that is, without separation of the two phases. On the other hand, to a water-in-oil emulsion, oil can be added without causing separation. Petrolatum by itself does not form a stable emulsion with water, neither of one type nor of the other. Most animal and vegetable fats and oils, however, can absorb a certain amount of water, but by themselves do not form stable oil-in-water emulsions. The main reason for the superiority of oil-in-water emulsions as vehicles is that they can absorb secretions, such as sweat and serum, without breaking down.

METHODS FOR PREPARING OIL-IN-WATER EMULSIONS

One method is to increase the viscosity of the water phase with thickening agents, such as gum acacia, tragacanth, agar-agar, pectin, etc. These agents have the disadvantage of being excellent substrates for the growth of moulds and bacteria, and preservatives have therefore to be added when they are used. Recently substances have been introduced on which micro-organisms do not grow, for instance methyl cellulose and other cellulose esters, and sodium alginate. A small percentage of these dissolved in water will produce viscous liquids which, if mixed with oil in a mechanical multifier or homogenizer will yield stable emulsions.

The usual method of preparing solid emulsions is to use soap as an emulsifier. If we boil animal or vegetable fat or oil with a weak solu-

tion of alkali in water, a small part of the fat will be saponified, forming alkali soaps of the fatty acids and free glycerin. These soaps will emulsify the unchanged fat in the water. The natural fats and oils, however, contain various fatty acids which, under the influence of air and moisture, impart an unpleasant smell to the product. In order to avoid this, the soaps are formed with pure fatty acids with a long carbon chain, such as stearic acid, while the oil phase is represented by mineral oil and paraffin or wax, and some glycerin is added. These emulsions are very stable and of pleasant appearance. They make excellent detergents; but as vehicles for drugs they have important disadvantages.

The disadvantages of soap emulsions are: (1) their high mineral oil content produces most of the undesirable features we have pointed out earlier; (2) soaps formed from alkali and fatty acids are easily hydrolyzed as all salts of strong bases with weak acids or *vice versa*. This gives the solutions of these soaps in water an alkaline reaction which very often irritates the skin. (3) These emulsions break down if acids or highly ionized salt solutions are incorporated.

The first of these disadvantages can be avoided by replacing the mineral oil wholly or in part by one of the relatively stable animal or vegetable oils, such as cod liver oil, corn oil, or peanut oil.

The alkaline reaction of ointments can be avoided by replacing the caustic soda or potash by a weak organic base. The one most frequently used is triethanolamine, a colourless, syrupy liquid, one part by weight of which reacts with two parts of the usual fatty acids, to form compounds that are very similar to soaps, but almost neutral in reaction. One-half to 1% of triethanolamine is sufficient to emulsify 20 to 50% of oil, making a fluid or semi-fluid cream which can be solidified by the addition of beeswax or of one of the auxiliary emulsifiers to be discussed later. It should be remembered, however, that it is the function of triethanolamine to replace the inorganic alkalis, such as caustic soda or potash, sodium or potassium carbonate, borax, etc. Unless it is neutralized by an equivalent amount of acid substances, it will produce an alkaline reaction that may irritate or even corrode tissues. This seems obvious, but one can still find formulæ which disregard this elementary fact.

The breaking down of soap emulsions by acids or strong electrolytes can be overcome only by abandoning soaps altogether and finding substances which, while showing a similar or better emulsifying effect, are more resistant against decomposition.

NEWER EMULSIFIERS

Sulfated oils.—Sulfated oils have been known and used in industry for a long time, particularly sulfonated castor oil, better known under its technical name "Turkey Red Oil". It is remarkable that for decades nobody investigated the possibility of using these excellent emulsifiers and detergents in the cosmetic and pharmaceutical industries. Sulfonated or, more correctly, sulfated oils are made by treating natural oils with sulphuric acid. This treatment yields oily liquids, soluble in oil as well as in water, which explains their detergent action. They are solvents for oil soluble substances which they disperse in water, forming oil-in-water emulsions.

The properties of these sulfated oils vary according to the oil from which they are made. Many of them, however, are likely to become rancid, and they generally have an acid reaction. The commercial sulfated castor oil generally contains 25 to 50% water. Clinical reports on the use of mixtures of sulfated oils as detergents replacing soap, have been published by Lane and Blank.²

Recently, a hydrogenated, sulfated castor oil has been marketed under the name "SHCO" and recommended as an ointment base to replace lanolin, petrolatum, etc. Here the unsaturated fatty acids have been transformed into saturated ones by the addition of hydrogen, in order to prevent rancidity and to change the consistency from an oil to that of a soft grease. Fiero³ claims that its pH is 6 to 6.3, approximating the pH of the skin. He lists formulæ for a large number of official ointments made with this product to replace the usual ointment base.

Wetting agents.—The application of this general idea of making organic substances water-soluble by treating them with sulphuric acid can be applied to individual chemical compounds as well as to the natural oils. This development has led to the production of numerous compounds known under the name of "wetting agents".

We will not enlarge upon the subject of molecular physics. The mode of action of wetting-agents may be found in the paper by Duemling.⁴ These substances have the remarkable property of reducing the surface or interfacial tension between two phases which, in our case, are either a liquid and a solid phase or two liquid phases. The interfacial tension is the energy which keeps oil and water apart and makes fine metal powder float on the surface of water though it actually should sink to the bottom because of its high specific gravity. A reduction of this tension produces most surprising effects, as for instance, the phenomenon of the drowning duck which, incidentally, provided the inspiration for one of the latest detective novels.* Fundamentally, this effect is similar to that of soaps or sulfonated oils and it is remarkable mainly because it is so much stronger. One-half to 1% of a wetting agent dissolved in water makes the water miscible with oil in all proportions. Of the innumerable wetting agents which have been patented in recent years a considerable number are being manufactured on an industrial scale, but not all of these are suitable for cosmetic or pharmaceutical purposes. They vary considerably in purity and some of them are irritating and may even cause dermatitis. Unfortunately, they are marketed under trade names, each name covering a group of substances made by one manufacturer, but different in chemical composition and properties. Though these different substances are distinguished by different letters, or groups of letters, of the alphabet, mistakes are likely to occur and it is advisable, therefore, to use the chemical name in prescriptions.

SULFATED FATTY ALCOHOLS

One large group of wetting agents comprises the sodium salts of the sulfated higher fatty alcohols, that is alcohols with a chain of eleven or more carbon atoms. The most important members of this group are the sodium salts of sulfated lauryl, cetyl, stearyl and oleyl alcohols, generally called sodium lauryl sulfate, sodium cetyl sulfate, etc. The commercial products are mixtures of several of these compounds though one member is generally predominant. They are white or yellowish powders, pastes, flakes, or wax-like solids. At concentrations of $\frac{1}{2}$ to 4% they make stable

* The Case of the Drowning Duck, Erle Stanley Gardner (Morrow).

emulsions of the oil-in-water type which are practically neutral. These emulsions are resistant to the action of acids, alkalis and electrolytes and, to a certain degree, even to heating and freezing. They can be made in any desired consistency, from a milk to a fairly hard cream, depending upon the kind and quantity of other ingredients (oils and waxes). By using certain proportions of oil and water, even clear mixtures can be obtained which have the appearance of a true solution. Any kind of water-soluble, oil-soluble, or insoluble drugs can be incorporated.

Another group with an even stronger wetting power is that of the esters of sodium sulfosuccinate, the dioctyl ester being the main product on the market. In a concentration of 1% it makes very good emulsions which are stable against acids and electrolytes. In alkaline solution (pH over nine), however, it is rapidly hydrolyzed and the emulsions break down. For making alkaline emulsions the same manufacturer offers another compound, under the same name, but with a different letter of the alphabet attached. Chemically, this compound is something entirely different, namely alkyl naphthalene sulfonate.

AUXILIARY EMULSIFIERS

From these wetting agents which are used in small quantities for dispersing oil in water and stabilizing these dispersions, we have to distinguish several other groups of substances, generally, but not quite correctly, called *emulsifying agents*. While the wetting agents replace the soap in our old ointment formulæ these substances replace the oils, fats and waxes. Actually, and in spite of their tongue-twisting chemical names, they are simply artificial, synthetic oils, fats and waxes. They differ from the natural products in various points: (1) They are generally chemical entities—that is, esters of one fatty acid only. (2) In some of them only one or two of the hydroxyl groups of glycerin are esterified with the respective fatty acid. (3) In others, glycerin is replaced by another of the polyvalent alcohols which are called glycols. Thus we obtain a whole range of substances showing the following valuable advantages: (a) They do not become rancid. (b) They are very stable and difficult to hydrolyze. (c) Most important, many of them are self-emulsifying, that is, they produce stable emulsions with water without any further addition. This means

that we can make creams, lotions and ointments which will not become rancid, though they do not contain any mineral oil. We can make them absolutely neutral and chemically inert, so that they will not be irritating. By adding a suitable wetting agent, we can make them resistant to acids, alkalis and electrolytes. There are such a variety of ingredients available that we can compound a suitable vehicle not only for every drug we wish to apply, but also for every variation in the condition of the skin or lesion we are treating.

Of these many substances, only a few can be listed here. There are the mono-, di-, and tri-stearates of glycerin: the stearates of the various glycols, for instance ethylene and propylene-glycol, the glycerin and glycol esters of other fatty acids, such as lauric, oleic and myristic acids. The melting points of these compounds rise with increasing molecular weight. The glycerin and glycol stearates, for instance, are wax-like solids, while diglycol laurate is an oily liquid. Another artificial oil is butyl stearate, the ester of butyl alcohol and stearic acid.

A group of substances with a similar effect are the higher fatty alcohols, mainly cetyl and stearyl alcohol. We have seen that the sodium salts of their esters with sulphuric acid are excellent wetting agents. The alcohols themselves are equally excellent auxiliary emulsifiers. Their very fine dispersion in water increases the stability of the emulsions and produces a smooth and velvety feeling on the skin.

GENERAL FORMULA FOR AN OIL-IN-WATER EMULSION

Multiple variations preclude giving definite formulæ. In general, however, a cream made with these modern ingredients will contain: (1) One-half to 4% of a suitable wetting agent; (2) 10 to 40% of one or several of the emulsifying agents (either fatty alcohols, or glycerin or glycol esters of fatty acids, or both), and any oil desired; (3) 5 to 10% glycerin as anti-drying agent; (4) the rest being water.

The emulsifying agents and oils are melted with any oil-soluble ingredients which are to be incorporated, while the wetting agent is dissolved in the water together with the glycerin and any water-soluble ingredients. The water is heated to the same temperature as the molten fats, poured slowly into the latter under stirring, and the mixture is stirred until cold.

With some of the preparations the oil and water phases may even be heated together, while others produce stable emulsions without being heated at all, simply by shaking them with water in the cold (for instance, ethylene glycol laurate). Details about their handling are generally obtainable from the manufacturers or can be found in the literature.

The acidity of the skin.—As already mentioned, all creams made with these preparations are neutral or very slightly acid. This is particularly important when we consider the fact that the skin normally has a slightly acid reaction, with a pH varying between four and seven. Whether the temporary changing of this acid reaction to an alkaline one by washing with soap has any deleterious effect may be a controversial question. To change it for a considerable length of time by the application of an ointment or cream which is alkaline or turns alkaline on contact with moisture, because it contains soap, is an entirely different matter. Burekhardt's⁵ observations of an increased sensitivity of people whose skin is rendered permanently alkaline by working with alkaline materials (for instance building labourers working with lime), are certainly worth considering. Furthermore, it is a well-known fact that many pathogenic bacteria and fungi are very sensitive to acids, but grow abundantly in a slightly alkaline milieu. Though our incomplete knowledge of the facts does not warrant any definite statements, it is conceivable that the "acid mantle" of the skin performs an important protective function.

The germicidal effect of wetting agents.—In this connection we wish to draw attention to a recent publication by Scales and Kemp.⁶ In a previous investigation these authors had discovered that some wetting agents had a stronger germicidal effect than the hypochlorite solutions generally used for sterilizing containers and machinery in the food and particularly in the dairy industry. Their findings were confirmed by Miller and Baker,⁷ Freedlander,⁸ and Dubos, Anson and Hotchkiss.⁹ The results of their latest experiments with a large number of wetting-agents show that many of these kill *Staph. aureus* in a few minutes at concentrations between 0.01 and 0.05% at a pH of four, and that their effect is not impaired by the presence of small quantities of organic matter, in this case, milk. These results were obtained with suspensions of bacteria in water. It would be very

interesting to determine the germicidal effect of these substances when applied in forms of creams and lotions to healthy and diseased tissue at various degrees of acidity. Though a pH of four, which is that of 0.015% (150 parts per million) of gluconic acid, or 0.0035% (35 parts per million) of phosphoric acid, is hardly likely to be irritating, the effect in a less acid medium should also be investigated. This would show how much of the bactericidal effect is due to the acidity itself. A certain caution in the use of these new ingredients should not be omitted. Not all the preparations on the market are chemically pure, and very few of them have been thoroughly examined for the allergic reactions they may cause. However, many of them have been used for several years on a large scale in the cosmetic industry, apparently without causing any widespread damage. In cases of allergy against sulfated alcohols, incidentally, the similar phosphated compounds may prove harmless.

High penetrating power of modern vehicles.—It should also be kept in mind that these new preparations have a much higher penetrating power than any vehicle hitherto in use. Petroleum and mineral oil do not penetrate the epidermis at all and, furthermore, prevent the major part of the incorporated drug from becoming effective by insulating it from the tissue. Ointments containing alkali soaps or triethanolamine esters show a somewhat better penetration. Those made with the above-mentioned wetting and emulsifying agents, however, have such strong penetrating power that small quantities of the incorporated drugs may even pass into the blood stream. With water-soluble drugs and when ointments are applied to large areas of broken skin this absorption may become quite considerable. In any case, the drugs incorporated into these vehicles will exert a much stronger action and their quantity should therefore be considerably reduced wherever an overdose may be harmful.

WATER-IN-OIL EMULSIONS

Time does not permit an extensive discussion of water-in-oil emulsions and other vehicles, such as jellies and mineral elays. The isolation from lanolin of that portion in which the water-absorbing power is concentrated, enables us to make greasy ointments which are much more pleasant than those compounded with the classical ingredients lard, lanolin, spermaceti, and

beeswax, with or without petrolatum. This portion, which represents the unsaponifiable fraction of lanolin, consists, according to Powers, Leask and Warner,¹⁰ of a mixture of aliphatic alcohols, cholesterol, so-called "iso-cholesterol", and a mixture of substances which they were unable to identify. Petrolatum containing 5% of this unsaponifiable fraction can absorb up to 350% of its own weight of water. Petrolatum containing either cholesterol alone, or cholesterol mixed with its esters with fatty acids, or mixtures of wetting and emulsifying agents, has an even higher water-absorbing power.

All these preparations are sold under various trade names (one product, "eucerin" is widely used), and lately have become known under the common name "absorption bases" or "oxy-cholesterol bases". It has not so far been tried, to our knowledge, to incorporate cholesterol and its esters into some of the more stable animal and vegetable oils or into some of the synthetic oils. This might lead to absorption bases with a still higher water-absorbing power and to water-in-oil emulsions with still better properties than those made with petrolatum.

Ursolic acid.—One of the latest additions to the list of emulsifying agents making water-in-oil emulsions is ursolic acid, ($\text{HO-C}_{29}\text{H}_{46}\text{COOH}$). It is insoluble in water, soluble in alcohol, ether and oil. At a concentration of only 0.3 per cent it is said to emulsify 75 parts of water in 25 parts of oil. In 1934 it was isolated from the skins of cranberries by Markley and Sando,¹¹ but it is not commercially available yet, the manufacturing process being still in the pilot plant stage. Since it is a natural product, proved by feeding tests to be non-toxic,¹² it should be valuable for the preparation of emulsions for internal use, for instance of fish-liver oils or the oil-soluble vitamins.

New greaseless vehicle.—Finally, we wish to mention a special type of vehicle which has been found useful for certain purposes. One of us has found that with the previously described emulsifying and wetting agents it is possible to solidify glycerin or glycols. The results are smooth, white creams, which are somewhat sticky if made from glycerin without water, but lose their stickiness if some water is added. They can be used for glycerin-soluble drugs, or where the emollient and antiseptic effect of a high glycerin or glycol concentration is desired. If made from glycerin alone, which is hygro-

scopic, they have a considerable dehydrating effect. This type of base proved its value for the first time as a vehicle for sulfathiazole¹³ for which it is particularly suitable because sulfathiazole is much more soluble in glycerin than in water.

SUMMARY

1. Petrolatum and mineral oil are unsatisfactory vehicles, whether used by themselves or as main constituents of emulsions.

2. As emulsifiers, triethanolamin esters are preferable to alkali soaps.

3. The fact that many cutaneous lesions are moist indicates the use of moisture-absorbing vehicles, that is, oil-in-water emulsions.

4. The slightly acid condition of the skin indicates the use of vehicles with a similar pH.

5. The most effective and at the same time most pleasant oil-in-water emulsions of a neutral or slightly acid pH are made with the help of wetting agents and auxiliary emulsifying agents. The chief wetting agents are compounds of sulphuric or phosphoric acid and higher fatty alcohols or other organic compounds. The chief auxiliary emulsifying agents are the higher fatty alcohols and the various esters of higher fatty acids with glycerin or glycols.

6. The local effect and the penetrating power of drugs incorporated into these emulsions are much higher than in other vehicles. Their dosage, therefore, has to be carefully adjusted.

7. Water-in-oil emulsions can be made more pleasant and more effective with cholesterol and cholesterol esters or with ursolic acid.

8. Greaseless bases containing little or no water can be made by solidifying glycerin or glycols with emulsifying and wetting agents.

Acknowledgment is made to Dr. Frederick Kalz for helpful suggestions in the preparation of this paper and to Quirk's Drug Store, Montreal, for their untiring work in trying out and preparing the various formulae.

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THE ASSOCIATION OF DEFICIENCY OF VITAMINS B₁ AND E DURING PREGNANCY

BY EVAN SHUTE, B.A., M.B., F.R.C.S.(C)

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MASON¹ has stated that male rats become deficient in vitamin E more slowly if also deprived of vitamin B. However, the writer² has pointed out that a neuritis attributable to B₁ deficiency (because curable by the use of B₁) was often found in those gravid women who required vitamin E to preserve their pregnancies. These contradictory observations would seem to demand further study of the relationship between deficiencies of vitamins E and B.

Deficiency of vitamin B₁ in pregnant women is not uncommon. Horwitz and Farley³ found that 15% of 86 such women revealed evidences of such avitaminosis. Baker and Wright⁴ have indicated that the requirement of B₁ in experimental animals increases about three times when pregnancy supervenes. Theobald noted an increased need of B₁ in pregnant women, too. Various writers, notably Theobald⁵ and Nixon⁶ have ascribed pregnancy toxæmias, in part at least, to such avitaminosis B₁.

Neuritis in the pregnant woman usually reveals itself first by a numbness or tingling of the hand or forearm on awakening in the morning, or as a "hip pain", which on closer examination is seen to be a localized sciatica. If such early symptoms are untreated, more extensive sciatic involvement, an intercostal or facial neuralgia, or extensive anæsthesia and even pain appear in the hands and forearms. It has never gone beyond this in the cases in this series, perhaps because of its early recognition and treatment, but of course severe polyneuritis and even true beri-beri have been recorded in the obstetrical literature.

In order to clarify the situation with regard to human pregnancy, an analysis has been made of 580 successive unselected pregnancies. These women were all taken to eight months or longer in the writer's private practice. Deficiency of vitamin E in these women was detected (a) by discovery of œstrogen excess in their blood;⁷ (b) by the development of certain phenomena of pregnancy which responded quickly to the administration of vitamin E, *e.g.*, threatened abortion,⁸ threatened miscarriage,⁹ threatened

prematurity,¹⁰ mild degrees of abruptio placentæ,^{11, 12} or a high-œstrogen pregnancy toxæmia.¹³

TABLE I.

<i>Daily amounts of vitamin E required to maintain pregnancy at term</i>	<i>Number of cases of pregnancy</i>	<i>Incidence of a neuritis responding to B₁ therapy</i>
None.	172	10%
One dram wheat germ oil.	95	24%
Two drams wheat germ oil or 10 mgm. ephynal.	105	27%
Two to four drams wheat germ oil or 20 to 25 mgm. ephynal.	112	22%
Six to eight drams wheat germ oil or 30 to 40 mgm. ephynal.	52	23%
Over eight drams wheat germ oil or 50 to 125 mgm. ephynal.	44	27%

DISCUSSION

Only 4% of 957 gynecological patients seen during the same period revealed such neuritis. Of the whole 580 pregnancies 70% showed E deficiency, and 17% B₁ deficiency, the latter figure approximating that of Horwitz and Farley. But of the 408 showing E deficiency, fully 24% revealed B₁ deficiency, and this incidence was not affected appreciably by the degree of severity of the E deficiency. It depended only on whether or not there was any degree of E-avitaminosis.

It will be recalled that E and B are found together in the germ of such edible grains as wheat, and therefore one suspects that if milling should remove any large fraction of the vitamin E from the diet it would bear just as hardly on the vitamin B associated with it. Pregnant women showing E deficiency revealed B₁ deficiency also two and one-half times as often as more normal pregnant women, which indicates either that these women live selectively on a poorer diet, or, which is a more likely possibility, have defective powers of assimilating several valuable qualities of their food. It is not uncommon to find that these same women are unable to utilize properly the calcium in their diet, and hence they often require additional vitamin D to prevent the development of pregnancy tetany. Of course, pregnancy represents

an added drain on the mother's nutrition and often reveals latent avitaminosis or produces mild degrees of it for the first time. For example, the pregnant women in this series had four times the incidence of B₁ deficiency that the non-pregnant group of women displayed.

The whole trend of recent studies in nutrition is to indicate that moderate or mild degrees of avitaminosis are much commoner than has been suspected. We have held too long to the belief that gross evidences of beri-beri or scurvy or osteomalacia constitute the first and only conclusive signs of vitamin deficiencies. There are still many authorities who deny that E deficiency is common in human beings, despite the increasing and readily demonstrated evidence that E-therapy effects dramatic cures of some of the most troublesome pathological states one encounters, such as oligospermia¹⁴ or threatened premature labour¹⁰ or senile vulvitis.¹⁵

Another argument for the more conservative milling of cereal grains is suggested by the above.

The toxæmia ascribed to B deficiency by Theobald⁵ and Nixon⁶ may be due in part to the concurrent E deficiency.^{2, 13}

SUMMARY

1. In 957 successive, unselected gynecological patients the incidence of B₁ deficiency neuritis was 4%.

2. In 580 successive, unselected obstetrical patients the comparable incidence of such neuritis was 17%. Pregnancy increases the requirement of B₁ about 4 times, therefore.

3. In 172 of these pregnant women showing no suggestion of vitamin E deficiency the incidence of such neuritis was only 10%, but in the other 408 with E deficiency the neuritis incidence was increased to 24%.

4. Thus avitaminosis of vitamins E and B during pregnancy is quite common, and is often concurrent, another example of the multiple avitaminosis which could be suspected *a priori* and is often uncovered.

5. This is another argument for preservation of the germ in milling cereal grains.

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RÉSUMÉ

Dans 957 cas de gynécologie courante, 49% présentaient de la névrite par manque de B₁. Dans 580 cas successifs d'obstétrique le taux de la même déficience montait à 17%. Donc, la grossesse augmente le besoin de B₁ d'environ 4 fois. Chez 172 de ces femmes enceintes où la vitamine E ne manquait pas, l'incidence de la névrite par déficience en B₁ n'était que de 10% alors que chez les 408 où la vitamine E manquait la névrite par hypovitaminose B₁ augmentait à 24%. L'avitaminose E et B durant la grossesse est fréquente. Une bonne prophylaxie sera réalisée en conservant toute la valeur vitaminique des graines de céréales.

JEAN SAI CHER

In the interests of hygiene and as an assistance in preventing the spread of possible serious epidemics women are being urged to adopt short styles of hair dressing; and the Guild of Hairdressers has devised a new cut—the "Liberty Cut"—to meet the demands of women in uniform or in factory or civilian life who have to rely upon their own efforts in washing and setting their hair. It is stated that one important advantage of the new cut is that more constant combing and brushing will be possible, as there is no fear of dis-

turbing an elaborate permanent wave, and this will enhance the sheen and improve the condition of the hair. It will be remembered that recent experience with evacuees has suggested that the chief reservoir of head lice is no longer the school child but the infant and the young woman and that infestation in the latter has been attributed to the popularity of elaborate coiffures whose preservation has contraindicated really adequate brushing and cleansing.—*J. Roy. Inst. of Pub. Health & Hyg.*, 5: 90.

PERNICIOUS ANÆMIA DUE TO DEFICIENCY OF EXTRINSIC FACTOR*

BY STUART R. TOWNSEND AND F. B. BEGOR

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THE occurrence of a case of pernicious anæmia due to a prolonged deficiency of the "extrinsic" factor and its correction by protein feeding alone, forms the subject matter of this communication. The period of almost continuous protein deprivation was approximately 20 years.

The common variety of pernicious anæmia encountered in clinical practice is due to a deficiency of the "intrinsic" factor. In the presence of unimpaired production of the "intrinsic" factor, a deficiency of the "extrinsic" factor may result in the same clinical picture. Castle and his co-workers¹⁻⁴ have shown that the antianæmic factor is produced by the interaction of the "intrinsic" factor found in normal gastric juice and an "extrinsic" factor supplied by the food.

A pernicious anæmia resultant from a loss of the "extrinsic" factor, if treated with liver and stomach preparations, probably would result in a complete remission of the condition. Under such circumstances the true nature of the deficiency would be obscured and the patient subjected to a lifelong treatment, which not only would be unnecessary but also trying to the individual both mentally and financially.

CASE REPORT

A male patient, aged 56, was admitted to the medical wards of the Montreal General Hospital on July 26, 1941, for investigation. The tentative diagnosis was pernicious anæmia or carcinoma of the stomach.

The patient was born in Austria and lived there until the age of 39 when he came to Canada. He had measles in childhood, "rheumatism" during the Great War 1914-18, and infection in the right leg 13 years ago. He fought with the Austrian Army, was wounded and captured by the Russians, and while in a Russian hospital had typhoid fever.

The patient states that he has not felt perfectly well for years, has always tired easily, and has had pains over the heart on exertion or excitement. He has frequently experienced "indigestion" characterized by periods of epigastric pain, sometimes abdominal cramps, loss of appetite, and occasionally nausea. For four months before admission he experienced alternating periods of diarrhoea and constipation, became progressively weaker so that eventually he was unable to walk a hundred yards without resting. During the past month before admission, excessive salivation and loss of weight had been marked features. For 20 years he had been a vegetarian.

The physical examination revealed an anæmic and

undernourished male with a lemon yellow tint to the skin and suggestive icterus in the sclera. The surface of the tongue was smooth and glistening, with marked atrophy of the papillae. A soft systolic murmur was audible at the apex of the heart. The blood pressure was 152/88. There were no disturbances of sensation, two-point discrimination, or vibration sense. There were no evidences of organic disease of the nervous system. The skin showed no obvious changes.

The urine was essentially negative; repeated examination of the feces for gross and occult blood was negative. The Wassermann test was also negative.

Free hydrochloric acid was present in the stomach, the analysis following 150 c.c. of 8% alcohol was as follows:

Time	Free HCl.	Total acid	Blood	
			Gross	Benz.
Fasting	0	7	0	0
15'	23	36	0	0
30'	40	49	0	0
45'	57	73	0	0
60'	72	90	0	0

Barium series revealed no evidence of gastric ulcer or carcinoma and an apparently normal gastrointestinal tract. A barium enema showed the large bowel to be normal throughout. X-ray of the chest also failed to reveal any evidence of disease.

Hæmatological findings, July 28, 1941: red blood cells 1,930,000; white blood cells 5,400; hæmoglobin 48% (14.5 gm. -100%); platelets 194,000; red cell diameter 8.4 microns (modal); differential: polymorphonuclears 43%; lymphocytes 53%; basophils 1%; eosinophils 3%. The majority of the red blood cells were macrocytes with a 4% reticulocytosis.

Blood chemistry: urea nitrogen 18 mgm. per 100 c.c.; creatinine 1.85 mgm. per 100 c.c.; van den Bergh 1.5 units; fasting blood sugar 0.090%.

Food	Amount	Protein gm.	Fat gm.	CHO gm.
BREAKFAST:				
Bread	4 slices	12	0	72
Butter	1 oz.	..	27	..
Fresh fruit	1 serving	..	..	10
Milk	1 glass	7	9	11
DINNER:				
Butter	2 oz.	..	54	..
Potato with skin	4 to 5	15	..	128
Fresh fruit	1 serving	..	..	10
Fresh vegetable	200 gm.	..	..	4
Milk	1/2 glass	4	5	6
Cereal	1 large serving	8	..	38
SUPPER:				
Bread	4 slices	12	..	72
Butter	1 oz.	..	27	..
Fresh fruit	1 serving	..	..	10
Milk	1/2 glass	4	5	6
Cheese (Cottage or cream)	2 oz.	15	20	1
Total		77	147	368

* From the Departments of Hematology and Medicine, Montreal General Hospital.

The stools were not analyzed for fat but did not show the features of steatorrhea, and diarrhea was not a feature during the course of hospital stay of 44 days.

Admission weight was 119 pounds (height 5 ft 3 in.). The patient's average diet was gone over in detail and reported as shown in Table 51 foot of page 352.

The patient included almost every vegetable with the exception of beets. Cheese was not taken regularly, but approximately $\frac{1}{2}$ pound in 4 days. Unsalted butter was used (patient did not care for anything salted). He occasionally drank chocolate milk, but never drank tea, coffee or soft drinks. During the last four months he ate lettuce frequently, bananas occasionally, and an egg rarely. Barely did he partake of nuts and raisins.

Of the protein from the above diet, only that from the milk and cheese can be considered biological protein (Grade A1). The diet probably contains sufficient vitamins, calcium, and phosphorus.

On the basis of these findings it was felt that the anemia was due to protein deprivation, since no other dietary deficiency could be established. The patient was placed therefore, on a high protein diet, exclusive of liver. No other medication was given except occasionally a laxative.

The response to this regimen is recorded in the accompanying chart, which shows a marked reticulocyte response shortly after the institution of meat in the diet, a rapid rise in red blood cells and hemoglobin, and a decrease in cell size and sedimentation rate.

There was a relatively rapid gain in weight and feeling of well being. The weight had increased to 137 pounds five days before discharge, and the red

blood cells were 4,250,000, and a hemoglobin of 88% and a cell diameter of 7.6 microns. Four weeks later the patient reported to the Outdoor Clinic stating he had remained extremely well. His weight on this occasion was 145.5 pounds, the red blood cells were 5,170,000, Hgb 92%, and a red cell diameter of 7.5 microns.

SUMMARY

The outstanding features in this case are:

1. The history of protein-poor diet, devoid of eggs and meat over a period of 20 years.
2. A clinical picture resembling pernicious anemia, with increased bile pigment in the blood, smooth tongue, but no skin changes, or positive neurological findings.
3. The hemogram showed a marked hyperplasia of macrocytic anemia, leucopenia, and relative lymphocytosis.
4. The presence of free hydrochloric acid in the stomach in normal quantities.
5. Regression of the anemia after the addition of meat to the diet, liver, kidney, etc., and iron being excluded from the food intake.
6. A marked reticulocyte response and return to normal of the blood count in a relatively

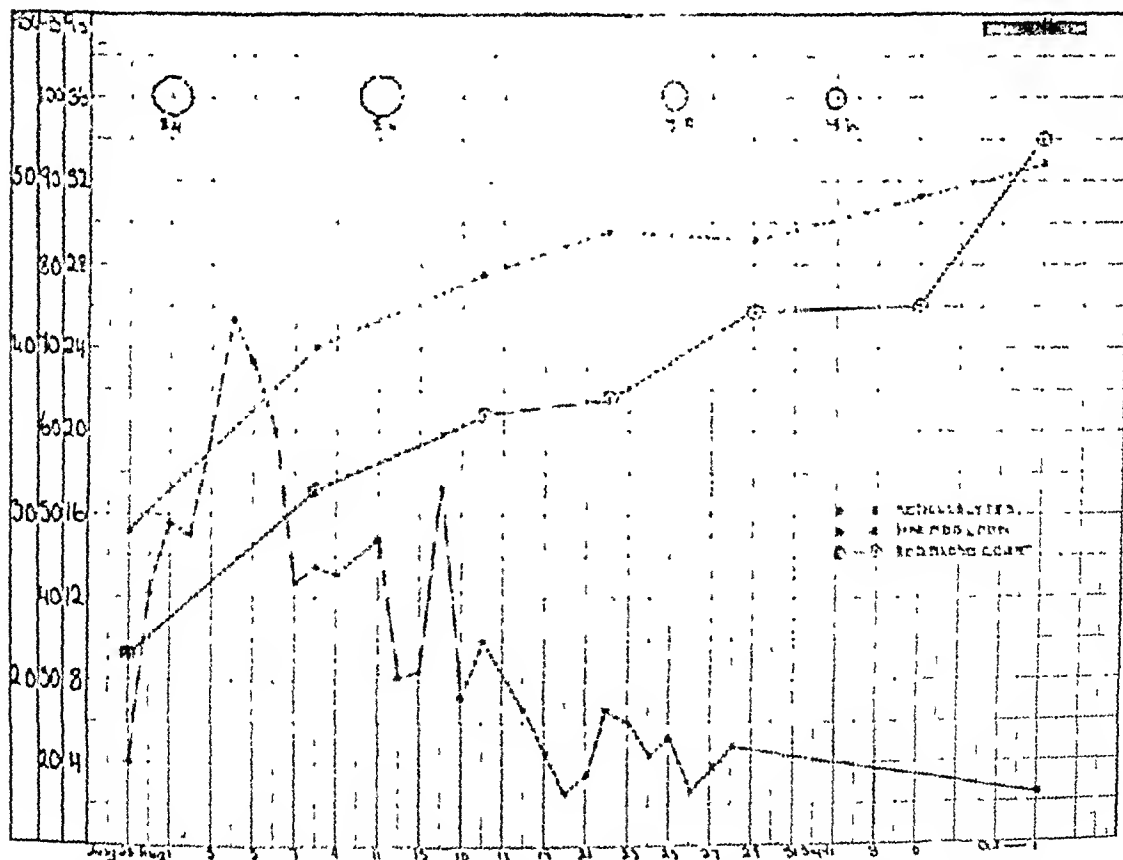


Chart showing reticulocyte, red blood cell and hemoglobin response following the addition of protein (meat) to the diet, and the return of the red blood cell diameter (microns) to normal

short period of time, associated with a pronounced gain in weight and feeling of well being.

DISCUSSION

Other anæmias of the macrocytic variety likely to produce this clinical picture were considered. However the patient showed no signs of idiopathic steatorrhœa, the gastrointestinal tract was normal, and there was no evidence of *Dibothriocephalus latus* or other intestinal parasites. In addition the patient showed no evidence of any other disease with which macrocytic anæmia is occasionally associated.

Kern⁵ was one of the first to point out that cases lacking in extrinsic factor might be the sole cause of a pernicious anæmia, and presented 3 cases to illustrate his arguments. In addition he discussed the German literature^{6, 7, 8} which showed that the period of greatest food lack as a result of the Great War and financial crash was in 1923. Protein food was particularly scarce, and in that year Germany reported its greatest incidence of pernicious anæmia. In 1923 it was seven times more frequent than in 1908 and three times the number in 1926, when stringency had been largely removed.

Similar cases have been reported by others and reviewed in two excellent articles by Groen and Snaffer⁹ and Alsted.¹⁰ In many of the cases free hydrochloric acid was absent but returned following treatment by diet alone. These cases, of course, resemble closely the type described by Wills¹¹ under the name "tropical" macrocytic anæmia. The cause of the anæmia in all these cases is a deficient food intake and is not necessarily confined to the tropics. Groen and Snaffer⁹ have suggested the term "macrocytic dietary deficiency anæmia".

The case presented in this communication recalls the cases commonly reported as "pernicious anæmia with free hydrochloric acid".

These reports have been reviewed by Alsted,¹² and many of the histories revealed the presence of dietary deficiency. However it is possible that Castle's "extrinsic" factor was absent in these cases, so that the diagnosis of pernicious anæmia was justified, but it seems more likely that the underlying cause of the anæmia was loss of the extrinsic factor.

Barnett in 1931¹³ proved this hypothesis by the daily administration of the patient's gastric juice mixed with beef to a test case of Addisonian anæmia. A typical reticulocyte response

resulted. This was considered in our case, but unfortunately a virgin case of pernicious anæmia was not available.

The development of pernicious anæmia in our patient may be explained by the pronounced deficiency of the extrinsic factor over an extremely long period of time, 20 years. The length of time for the development of the anæmia was perhaps influenced by the small amount of biological protein in the diet and the continued presence of the "intrinsic" factor in the gastric juice. There seems no reasonable doubt that the anæmia was due to the dietary deficiency alone. This would explain the satisfactory and lasting result of treatment, and it seems probable that the patient will remain well so long as he does not again restrict his diet to the exclusion of protein.

This case is believed to be an instance of a pernicious anæmia due to deficiency in protein causing deprivation of the extrinsic factor. It is presumably more common than generally believed. Such cases can be cured by supplying protein in sufficient or adequate quantity, and need not be supplemented by liver extract. Treatment with the latter is liable to obscure diagnosis and confine the patient to a life regimen both unnecessary and expensive. In the presence of a second Great War it is not improbable that many more similar cases will be encountered, especially in those countries subjected to great food lack such as occurred in Germany during the last Great War.

From the literature it would appear that similar cases exist. However, in these reports, free hydrochloric acid is absent, but following treatment normal acid values are found. This suggests that all stages may exist from an exogenous reversible form of anæmia to the purely endogenous irreversible form, to which the greater number of pernicious anæmia patients belong.

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TREATMENT CENTRES IN THE CONTROL OF SYPHILIS*

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[T is historically correct to assume that every war brings in its wake an increase in venereal disease; this is due in part to the psychological effect of war on the masses and also to the concentration of young men and women in barracks, camps, factories and other organizations. This problem exists in Canada and must be seized upon and dealt with effectively.

Although the medical profession is partially aware of this fact, the man in the street has not yet realized the menace of syphilis as a major health problem. Available statistics reveal that 10% of the population is or has been at sometime affected with syphilis¹ and that the number of those receiving sufficient and rational treatment is rather inconsiderable. Recent figures regarding the rate of positive serological findings among the first million selectees and volunteers in the United States were 4.5%.² There was no pertinent difference found between the rural and urban population; this figure is very high considering that the majority of men examined were in their early twenties. Dyar³ in a statistical review among selective service registrants gave the following figures among the white population:

20 to 24 years	0.54%	These figures were found in a rural district in California and the total incidence was well under the average for United States.
25 to 29 years	2.12%	
30 to 34 years	4.98%	
Over 35 years	9.84%	

There is no reason to assume that the prevalence of syphilis in Canada is lower than that in the United States.⁴

Early in the twentieth century we had in our possession the means by which syphilis could be controlled, at present we have the knowledge to eradicate it, but how to apply this knowledge effectively is the problem, one which no longer can be ignored. It has been demonstrated repeatedly that the efforts of the general practitioner are not sufficiently far reaching and that treatment centres on a larger scale are necessary for the handling of a large number of patients. Various methods have been tried in this regard in different countries. State owned,

provincial and municipal clinics, also those established by health insurance companies, have been tried as well as clinics forming special departments in existing hospitals. In Canada, where the population is spread over a great area with a relatively dense network of modern hospitals, this last-mentioned type of departments has its merits, save that there exists an urgent need for standardization of system and treatment to be adopted uniformly by hospitals throughout the Dominion.

This article is intended to lay open for discussion the possible establishment of clinics and to propose a clinical procedure for the organization of syphilis centres, as for example, the established treatment centre of the Royal Victoria Hospital in Montreal. Though the latter has been made for large hospitals only, it has, in theory, numerous adaptable features which could serve as a basis for the founding of suitable clinics in smaller hospitals.

Due to the fact that many members of the staff have joined the army, it may at times be rather difficult to fulfill all the requirements of the syphilis department. Every hospital in Canada is probably faced with the same problems, and the issue at hand is to sustain an effectively run organization with a minimum medical staff. The employment of female assistants would be the logical solution. Since the passing of a new law in March, 1941, making compulsory the treatment of syphilis in Quebec, funds have been granted by the Province for the employment of a technician and a social service worker and the public health authorities are now endeavouring to educate the public and to guide the medical profession towards an organized application of this law.

The staff necessary for a treatment centre should be composed of:

1. One or more syphilologists according to the size of the clinic. A syphilologist may be a physician, a urologist or a dermatologist, familiar with all the clinical phases of the disease, its therapeutic and diagnostic problems and techniques, as well as with its biological, physiological and serological aspects and public health problems.

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2. One or more junior physicians, to assist the syphilologist in the examination of the patients.

3. One or more assistants to prepare and give the treatment, a trained technician or specially trained nurse who may substitute for an intern. This is advantageous in so far as it makes possible the administration of treatments by one person without change.

4. A trained social service worker or nurse with special social service training.

5. A clerk to control attendance, keep statistics, type necessary letters, and fill out forms.

6. A system of co-operation has been worked out between the Department of Neurology and Dermato-syphilology at the Royal Victoria Hospital. Every case of neurosyphilis is discussed between the members of these departments and the treatment plan is decided upon. The neurologist supervises the following therapy.

Of great importance in an efficiently run treatment centre is the co-operation of the members of the departments of cardiology, neurology, dermatology, urology, ophthalmology and obstetrics, whose advice is necessary and helpful when special problems arise.

It is also necessary to have the facilities of a well equipped x-ray and serological laboratory.

The war against syphilis may be divided into three phases: (1) finding the people infected with the disease; (2) administering the proper treatment; (3) keeping the patients under continuous treatment and control, thus preventing the infection of others and the spread of the disease.

The first step in finding those infected must be taken by the medical profession through the medium of hospitals. Serological examination of all indoor patients is a recognized routine in many hospitals throughout the country, especially in maternity wards, where a rather high incidence, 2 to 8%,¹ of patients with a positive serological test have been found. In 1941, positive serological tests of 3.4% was found in patients attending the Royal Victoria Maternity clinic.² A routine serological examination, employing one of the quick, economical, but accurate precipitation tests, should be extended to all outdoor patients. Patients found to have a positive reaction to this test should be submitted to a blood Wassermann reaction, and a clinical examination. Another contribution of the hospitals in the detection of cases, is the epidemiological or contact research; this impor-

tant feature is all too frequently neglected, through a lack of thoroughness in questioning patients, with a consequent failure in tracing the infection to its source and the detection of new cases. In Johns Hopkins Hospital, investigations of the contacts of 113 cases of infectious syphilis led to the discovery of 72 previously unrecognized cases of syphilis, 42 of them in the infectious stages. There were in addition, 69 previously known cases among the contacts named, and only 52 of the contacts examined did not have syphilis.³ Most authorities are of the opinion that for every two infectious cases, 3 infected contacts will be found.⁴ It is imperative that the importance of contact research be impressed upon nurses and social service workers. Every patient should be interviewed by the physician and social service worker, and the public health aspects properly explained to them. By using a psychological approach most patients will co-operate and name contacts. All persons named as well as the entire family should be examined, and any of them found infected by the disease, should disclose their contacts. The social service worker must assure the patient of absolute discretion and be able to explain the situation frankly. Contact research is a method of prime importance in combating syphilis and, unfortunately, the most neglected one.

The question now arises as to the best method of placing all patients with positive findings under treatment. Every patient found to be serologically positive is examined by the syphilologist and the nature of the disease, its epidemiological and individual aspects thoroughly explained. The patient is also interviewed by the social service worker.

Statistics reveal that only a small fraction of patients attend clinic regularly, few of them finish their treatments and fewer still return for the necessary after control. The Washington University Clinic found that prior to the establishment of a social service department, only 3% of male patients with gonorrhœa remained under treatment until cure was established. Since the organization of an adequate social service department only 10% of the patients have been lost.⁵ At Notre Dame Hospital in Montreal an incidence of 70% of lost cases was recently reported.⁶ This will be borne out by all hospitals and physicians, all of whom will presumably agree that this deplorable state could be overcome to a certain

degree by the adoption of measures such as the following: (1) Proper registration of patients. Many cases have been lost because of improper registration. The address of the patient is not sufficient. The name and address of the employer, of one or two friends, parents and children, if any, with their status must also be noted. (2) Convenient clinic hours, such as would not interfere with the patient's work or jeopardize employment. A night clinic is necessary for those unable to attend by day. To facilitate control the patient should return to the same clinic each week. (3) Fees for treatment, if any, should be adjusted to suit the individual. (4) Patients should not be kept waiting unduly. (5) In cases of irregular attendance, the social service worker should investigate the cause of lapse, which in most instances is easily remedied.

The most frequent causes of lapsing are: (1) Conflicting working hours. (2) Indifference. (3) Underestimation of danger of infection. (4) Treatment reactions. (5) Dissatisfaction with clinic personnel. (6) Misunderstanding of treatment plan. (7) Neurotic personality. The first six causes may easily be remedied by proper approach of the physician and social service worker.

It is necessary to gain the confidence of the patient. Thorough explanation of the case should be made, stressing the necessity of treatment and the dangers of possible complications; an appeal to the patient's sense of duty to his family and the community will in most instances insure regular attendance at clinic. We are endeavouring to organize our social service with special regard to contact finding and case holding. In 1911, 22% of our patients with early syphilis did not attend clinic regularly. The incidence of irregular attendance or of complete lapse was much higher in late syphilis. We hope to be able to record more favourable figures in the coming years.

If a patient misses more than one appointment, a letter couched in general terms should be sent immediately; if this fails to bring results, a second letter of more official character, preferably from the Department of Public Health, should be sent. If the patient does not return to clinic or answer the communications, no further time should be lost, the social service worker must visit him, especially in cases of early infectious syphilis or where there is grave danger of complications. Very few

patients will refuse to attend clinic and if so, report of such incidents to the health authorities for legal action is advisable and justified.

The syphilis clinic at the Royal Victoria Hospital is held in conjunction with the dermatology clinic as a sub-department of medicine. It is less offending to the patient to attend a clinic which is not actually called a syphilis clinic, considering the prejudices still attaching to venereal diseases. Clinics are held four times each week. Two clinics, one on Monday held in conjunction with the skin clinic and one on Thursday, are reserved for routine treatment. Monday is especially devoted to the examination of new patients. On Wednesday, the clinic is held at night for day workers, while the clinic on Friday is reserved for special procedures, arsphenamine, intraspinal therapy and lumbar punctures. In addition, a family clinic is held on Mondays. While the parents are receiving treatment at the regular clinic, the infants and children are treated in a special clinic managed by a paediatrician and a syphilologist; this being the simplest method to make clinic attendance easier for mothers.

Following are short outlines of the routine procedures in the Royal Victoria Treatment Centre.

Early syphilis.—(Primary and secondary stage and early latency up to 2 years after infection.)

1. Dark field examination of serum from primary lesion if present, or fluid from lymph node puncture. It is unnecessary to stress the importance of dark field examination in all suspicious lesions as it is common knowledge that the chances of complete cure are best in the seronegative primary stage. A lymph node puncture is important, especially if lesions have been externally treated, as many cases, otherwise found negative, have been detected by this procedure.

2. *Serological examination.*—A quantitative Wassermann and a Kahn test are done before starting treatment. A quantitative serological reaction enables one to watch the decline of the titre during therapy, which is of help in evaluating the effect of treatment. Every laboratory should perform at least two tests, one of the Wassermann reaction modifications adopted by the serology conference and a reliable precipitation test.

Reports should be recorded as suggested by the International Serological Conference as posi-

tive, doubtful or negative. The pseudoquantitative method of reporting results as +, ++, +++ and ++++, has been discouraged by most of the competent serologists. Repeatedly positive results with both tests, in the absence of clinical symptoms, are considered as evidence of syphilis. The incidence of true false positive results in normal persons is less than 1-4,000 and is, from the public health point of view, negligible.⁹ Positive serological tests may be found when malaria, infectious mononucleosis, acute upper respiratory infections and tropical diseases such as leprosy, trypanosomiasis or yaws are present. Transitory, false positive results have been reported after vaccination.¹⁰

A doubtful result calls for repetition of tests, clinical examination, and careful history in persons not known to be syphilitic. If changing, doubtful, or positive results are found on repeated examinations and different tests, syphilis is highly probable. If the results are doubtful in treated patients or known syphilitics, it merely means that the amount of reagin in the patient's serum is low, and treatment should be continued according to plan. A negative result does not mean that the patient is free from this disease. The sensitivity of tests reaches about 80%, and clinical examination and history are the decisive factors.

3. Physical examination includes a complete physical as well as a careful history in order to determine whether a patient has any other disease which would interfere with antisyphilitic therapy. Lumbar puncture is done if infection is of more than six months' duration.

4. Thorough explanation is given regarding the disease, its infectiousness and prognosis.

5. Interview with social service worker regarding contacts and appointments. When it has been established that the patient has syphilis, he is interviewed by the staff physician before therapy is started. The treatment plan is explained and the patient is instructed to report any untoward reactions. Before each treatment patient is thoroughly questioned.

6. Routine treatment follows with slight variations, schemes given by Moore in his excellent book, "The Modern Treatment of Syphilis".¹¹ It has been proved during the last few years that intensive treatment during the first six months of the infection is of paramount importance; this method quickly renders the patient non-infectious and prevents infectious relapse.

ROUTINE TREATMENT IN EARLY SYPHILIS

USING MAPHARSEN AND HEAVY METAL

1 to 10th weeks mapharsen* 0.06 twice a week.	9 to 14th weeks bismuth, 2 c.c. once a week.
15 to 30th weeks mapharsen twice a week.	29 to 36th week bismuth, 2 c.c. once a week.
37 to 46th week mapharsen once a week.	45 to 54th week bismuth, 2 c.c. once a week.
55 to 64th week mapharsen once a week.	63 to 78th week bismuth, 2 c.c. once a week.

* Mapharsen 0.06 gm. is the usual dosage unless contraindicated.

USING NEOARSPIHENAMINE AND HEAVY METAL

1 to 8th weeks neoarsphenamine* twice a week.	7 to 12th weeks bismuth, 2 c.c. once a week.
13 to 22nd week neoarsphenamine twice a week.	21 to 28th week bismuth, 2 c.c. once a week.
29 to 38th week neoarsphenamine once a week.	37 to 46th week bismuth, 2 c.c. once a week.
47 to 56th week neoarsphenamine once a week.	55 to 71st week bismuth, 2 c.c. once a week.

* Neoarsphenamine 0.6 gm. is the usual dosage, unless contraindicated.

Unless old arsphenamine is given, the arsenicals should be administered twice weekly; this is especially true when mapharsen is used, as this drug is excreted within four days. Furthermore, it is necessary to overlap bismuth, this drug being slowly absorbed, if a continuous blood level of antisyphilitic drugs is to be maintained.

7. The blood test is repeated every eight weeks and if decline of the titre, or serological reversal does not occur in due time, the treatment plan is changed and a lumbar puncture done. Arsphenamine is used for cases resistant to routine therapy.

8. A lumbar puncture is done on every patient before treatment is concluded. The laboratory investigations include the following points: Cell count, Pandy, determination of total proteins, quantitative Wassermann, and colloidal gold test. Each of these is important, as many cases of neurosyphilis may be missed if a Wassermann reaction only is performed, as in such cases the only signs may be an increased cell count, high amount of proteins and/or slight irregularity in the gold curve.

Late latent syphilis.—(Syphilitic infection of unknown duration or dating back two years or more). The routine procedures are the same as for early syphilis, but the clinical examination is more complete and includes:

1. Complete neurological examination with special attention to the optic nerve.

2. Lumbar puncture is done in all cases before starting therapy.

3. Roentgen examination of heart is made regularly as many cases of beginning aortitis give no clinical symptoms and signs. If any abnormalities are present, additional film studies are made.

4. An electrocardiogram—proves valuable when myocardial changes are present. It enables one to follow the clinical course of the disease and in some cases to evaluate the effects of treatment on the condition.

It is often very hard to differentiate between a syphilitic and a rheumatic heart condition and consultation with a cardiologist will determine whether either or both conditions are present. The frequent occurrence of cardiovascular involvement in neurosyphilis as described by many authors has been observed in our clinic and many therapeutic problems have arisen from this coincidence.

5. Liver, bones, kidneys (including frequent routine urinalysis) and eyes (including optic nerve) are carefully checked.

If no organic lesions can be found, the case is diagnosed as a late latent syphilis and the treatment planned accordingly. It is usually more or less mild, with fewer courses of arsenic and more of heavy metals over a longer period of time. Yearly re-examination and after control are important.

Positive serology does not always warrant continuation of therapy, as many patients in this stage of the disease have a fixed positive Wassermann reaction. Rapid reversal of, or a negative, Wassermann reaction is no reason for discontinuation of treatment before plan is finished as blood serology is of minor importance in latent syphilis and is no lead in determining the therapy. Biological and even serological cure cannot be obtained in many cases and the determining factors for intensity and duration of treatment are the age of the patient, the duration of the infection and the evaluation of the danger of developing deleterious organic lesions.

Cardiovascular syphilis.—In cases of cardiovascular syphilis no schematic treatment plan can be followed. The treatment is usually mild, with potassium iodide, mercury or bismuth given over a long period of time, followed by mild arsenical treatment. Fluoroscopy and electrocardiogram are repeated frequently and the clinical progress closely followed.

Neurosyphilis.—Therapy and methods for treating neurosyphilis can only be briefly

sketched. The diagnosis is made in co-operation with the neurologist and the treatment planned accordingly. Routine procedures before beginning therapy: (1) Complete physical examination. (2) Complete neurological examination including lumbar puncture. (3) Consultation with ophthalmologist, if necessary. (4) Fluoroscopic examination of aorta. (5) Cystometrogram. In our material a very high incidence of neurogenic parietic bladders have been found, which was in many instances, the only sign of asymptomatic neurosyphilis. Detailed report of these findings will be published at a later date.

If liver is enlarged, a bilirubin, bromsulphalein or other liver function tests are done.

If additional heart disease is present, a fluoroscopy, film and electrocardiogram are made and a cardiologist consulted.

During treatment: (1) Frequent check of above mentioned tests. (2) If tryparsamide given, visual fields to be made before, and after starting therapy, for the first ten injections. (3) Repeated lumbar punctures, to control treatment effect. (4) Repeated neurological examinations.

Routine examination before giving malaria: Fluoroscopy, electrocardiogram, liver function tests, cystometrogram, hæmogram and non-protein nitrogen.

During malarial therapy, blood pressure should be continuously checked, liver function tests, hæmogram, urinalysis and non-protein nitrogen are done twice a week.

Routine treatment in asymptomatic neurosyphilis.—Group I (negative Wassermann reaction, increased cell count, high total protein and sometimes positive Lange curve found in spinal fluid). Intensive routine therapy with neoarsphenamine, mapharsen or arsphenamine and bismuth as outlined in chart. Lumbar puncture is repeated every six months and if no serological improvement, arsphenamine is given.

Group II (positive Wassermann reaction, often increased cells and protein with a colloidal gold curve of non parietic type). Arsphenamine. 0.4 to 0.5, three to four courses of 10 to 12 injections each, alternated with short courses of bismuth. If spinal fluid shows no improvement, fever is given, usually followed with tryparsamide. If condition reacts favourably to arsphenamine and bismuth, treatment is continued for at least two years.

Group III (Wassermann reaction positive in titration to 0.1 in spinal fluid with parietic type

colloidal gold curve). Malaria, followed by tryparsamide for two years with concurrent courses of bismuth.

Meningovascular syphilis.—Early meningitis: Large doses of potassium iodide and bismuth followed by arsphenamine for two years.

Vascular: potassium iodide, mercury, bismuth to be followed by neoarsphenamine for at least two years. Fever and tryparsamide given in some cases.

Diffuse meningovascular: preparatory treatment with mercury and bismuth with potassium iodide, followed by arsphenamine and fever and/or tryparsamide.

Active tabes, especially early involvement in young patients: arsphenamine with alternating courses of bismuth. Fever and tryparsamide are given in some cases and sometimes intraspinal therapy (Swift-Ellis technique).

Optic atrophy, tabes with crises: malaria and/or intraspinal therapy (Swift-Ellis technique).

Nonactive tabes: mild courses of neoarsphenamine with alternating courses of bismuth.

Taboparesis and G. P. I.: malaria followed by tryparsamide for two years.

Combined cardiovascular and neurosyphilis: tryparsamide or intraspinal therapy with heterologous serum and concurrent courses of bismuth subsalicylate.

There is no routine treatment for meningovascular syphilis or tabes with special features as well as for other complicated cases. Treatment is discussed with the neurologist.

It is thought advisable to start therapy with arsphenamine in all early cases of previously untreated neurosyphilis, providing there is no serological evidence of parietic type or other contraindications. If spinal fluid does not show any improvement on re-examination, fever and/or tryparsamide are used. In late neurosyphilis, therapy is started with tryparsamide provided the optic nerve is not involved and followed by fever in most cases.

PREGNANCY AND CONGENITAL SYPHILIS

Great care should be taken in treating pregnant women. Every case of syphilis detected in the maternity clinic is reported to the Social Service department of the treatment centre and therapy started without delay. Such cases are regarded as early syphilitics and the intensive treatment plan is used.

Syphilitic babies are treated in the family clinic. The quantitative Wassermann is of great value in diagnosing the infection. Some infants have been labelled as syphilitics because of a positive cord Wassermann or positive blood Wassermann reaction; this positive result, in some instances was caused by a passive transfer of reagin from the mother's blood. If the titre of the quantitative blood Wassermann decreases quickly after birth without treatment and becomes negative within two or three months, the infant is unlikely to develop congenital syphilis, but observation over a period of years is necessary. X-ray of the long bones is a routine examination in such cases and is often helpful in making a diagnosis. If no clinical signs are present the diagnosis is based chiefly on the stage of the disease in the mother, on the amount of treatment before and during pregnancy. Lumbar puncture in congenital syphilis is as important as it is in acquired syphilis; in approximately 20% the spinal fluid shows positive serological tests. The test is usually done at the age of eight months.

As routine treatment, sulpharsphenamine and bismuth are used. Stovarsol is used in selected cases only, as control is impossible.¹² The general health of an infant during treatment is of greatest importance and should be carefully watched by a paediatrician.

In interstitial keratitis, arsphenamine is used in all cases if technically possible and the results, to date, have been encouraging. In contradiction to other investigators, we have not had any cases with involvement of the second eye when treatment was given regularly. In addition, riboflavine is given as long as activity is present.¹³

In 1941, there was a high percentage of late syphilis in the clinic at the Royal Victoria Hospital: early syphilis 63; late latent syphilis 88; neurosyphilis 53; cardiovascular syphilis 34; transferred 43; cases lost 86; control cases 43.

Five cases appear twice in these statistics suffering from both neurosyphilis and cardiovascular syphilis. The high incidence of late and dangerous complications in our material demonstrates the inadequate treatment which these patients have received during the past decade, while the number of cases lost proves the inadequacy of the social service.

We are not endeavouring to create a large clinic, but rather to keep a restricted number of cases under treatment with proper therapy,

thorough investigation and after control. A special file to control the attendance and appointments of every patient is kept by the statistician. In the Province of Quebec, every new case is reported to the Public Health Authorities monthly on a special form as is a monthly statistical report regarding the number of patients, diagnosis and treatment.

Syphilis was practically stamped out in several European countries by adoption of similar methods, and it is our belief that the same results could be achieved in Canada.

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Case Reports

EPIDERMOLYSIS BULLOSA

By S. ADRIAN YAFFE, M.D., M.R.C.P.(LOND.)
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Epidermolysis bullosa (acantholysis bullosa) is a rare disease, but it has received a goodly share of contributions as evidenced by the literature on the subject listed in the Index Medicus. I have been unable to read the many foreign contributions on this condition, but I have gathered that nothing new has been developed since it was first described.

My cases are two adult brothers who are in the army. Because of their interesting family history, together with the problem of occupation, these cases are now presented.

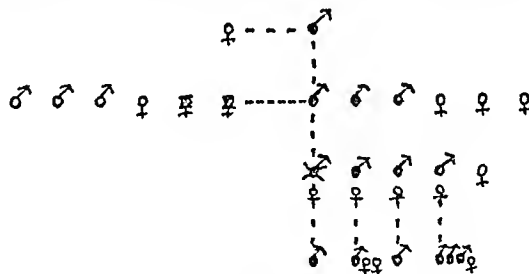
CASE REPORTS

Both of these males have suffered from epidermolysis bullosa since infancy. When they first learned to crawl they developed blisters on their knees. The slightest form of trauma seems sufficient to raise a blister. The skin is so vulnerable that even pinching it will cause the development of a blister within a few hours. Elastoplast dressings or ordinary adhesive tape applied to the skin results in blistering. They cannot wear puttees without developing blisters. Since joining the army their main complaint has been blistered feet. If they go out on any route march they are certain to return with blistered feet. It is not the fault of their shoes or stockings, it is the inherent property of their skin.

The bullae formed are unilocular flaccid lesions, with clear serous fluid, their size and distribution dependent directly on the trauma. Very little discomfort is suffered, either in the bullous stage or when the vesicle has ruptured. The lesions heal rapidly. There is no systemic reaction and well-being is preserved even when the picture is complicated by an intercurrent disease.

As a general rule, the parts of the body most subject to trauma are the hands, elbows and feet, and here we most frequently find the lesions. Both patients have a light beard and are able to shave without resultant lesion. They easily sunburn and blister, but with care can avoid such developments.

Their family history is of much interest. Their paternal grandfather, their father and his two brothers suffered from the same condition. It is interesting that these men were in the army in India and suffered from



foot trouble all the time. The present cases belong to a family of five children, four males and one female. All the males suffer from this condition. The female is free. One male died of cancer of the throat. Their mother and mother's sister also died of cancer of the throat. Both of the present patients are married and their male children suffer from the same condition. Unfortunately, more of the family history cannot be obtained. The attached graph shows the family distribution.

DISCUSSION

The above picture is that of the simple uncomplicated epidermolysis bullosa congenita. Some cases are described where the disease does

not manifest itself until adult life. Whether this is the same disease or not is questionable, but such cases are usually called epidermolysis bullosa acquisita.

There is also a type which in addition to the above picture is complicated by dystrophic changes. Scar tissues may form at the site of the lesion or the skin may show a wide area of atrophic changes. In these cases there is often involvement of the mucous membranes such as the conjunctiva, nose and mouth and these may acquire atrophic changes. In rare cases the condition affects the nails and the teeth.

The family history noted here reveals that the disease is a congenital one and has been apparently transmitted through the male sex only. This need not be the case, as there are examples of this disease in both sexes. The resultant sex determination probably depends upon genetic qualities, but this cannot be defined by a study of one family tree.

Also of interest is the fact that one brother died of cancer of the throat. Since the mother's family history revealed cancer of the throat, it is pertinent to the question, whether or not epidermolysis bullosa was a predisposing factor in the one case.

Regarding the epidermolysis bullosa in the army, it is obvious that such cases, in spite of their willingness, are unsuitable for general active service. They can however, perform work in special fields where the problem of trauma is simply avoided.

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MULTIPLE FRACTURES UNDER METRAZOL

BY W. G. TRAPP

Essondale, B.C.

The following case of multiple fractures occurring in one of our patients who was being treated with metrazol was the first such case to occur in several thousand treatments given in this hospital. It may be that you would be interested to report it to your readers.

The patient was a female of 45 years, 5' 1" tall and with moderately developed musculature. She had been admitted to the Provincial Mental

Hospital of British Columbia in an agitated depressed state and was diagnosed as having involutional melancholia. Complete physical examination before treatment, including a chest x-ray, showed no abnormality. During the course of her convulsions she was restrained by five attendants. Anterior curvature was con-



The upper picture does not include the left scapula with the avulsion of its anterior border.

trolled by pressure on the pelvis and on the shoulders. The arms were held closely at the sides, and the jaws were restrained so that excessive opening was prevented. The patient had undergone six convulsions while restrained in this manner without untoward incident.

Immediately following her seventh injection the patient reacted in the usual manner with a latent period of 50 seconds followed by the tonic stage of the convulsion. After some 20 seconds of a slightly exaggerated tonic phase there was a distinct hard grating sound seeming to come from the depth of her chest. It lasted only a few seconds and was succeeded by the clonic stage which lapsed uneventfully into the post-convulsive period of coma and confusion.

Some 2 hours later the patient complained of

stiffness in the right shoulder and in the back between the shoulder blades. X-ray examination disclosed a comminuted fracture of the head of the right humerus; avulsion of some 2" of the anterior border of the left scapula and com-

pression fractures of the bodies of the 9th and 5th dorsal vertebrae.

The patient was placed in a plaster spica with both arms in abduction. A month later she was recuperating successfully.

Clinical and Laboratory Notes

AN EASILY MADE "DROP-WRIST" SPLINT*

BY HAROLD ELLIOT, CAPT. R.C.A.M.C.

Because of the closest co-operation with Unit Medical Officers we have seen at this General Hospital many more "Saturday Night" (or "Pay-Day" as we call it) paralyses, than was customary in civilian life. We have used these temporary infirmities to develop a simple and convenient splint in preparation for more serious and permanent injuries of this type.

Our splint, after several attempts, finally took the shape of those developed by Henry Meige, Froment and Mueller in the last war. It, however, is even simpler since elastic bands are used instead of metal springs. The whole apparatus is made by our patients on the neurological ward, under our guidance and the supervision of Occupational Therapy. Incidentally, the more instances of having certain convalescent patients make curative apparatus for other invalids improves the response to occupational therapy and adds to the congenial atmosphere on the ward.

The splint consists of a separate and adjustable (1) wrist band which has been stiffened so as not to buckle, and padded so as not to impede circulation.

The finger-piece consists of a metacarpal strap (2) to which four finger cots (3) with adjust-

able elastic tapes (4) are tied. The metacarpal strap is suspended in turn by elastic traction to the pivot-piece (5). This piece is tied to an attachment (6) on the wrist band. By increasing the tension between the pivot-piece and the



wrist band we can balance the antagonistic action of the flexor muscles. A separate slip (7) for the attachment of the thumb cot on either side allows the splint to be used on either hand.

The familiar metal cock-up splint has usually a volar wrist piece with a terminal support which fits into the palm of the hand. This can be attached, if necessary, to our type of splint for added support. The elastic variety, however, enables the patient to make greater use of his hand, and if his right hand is affected he greatly appreciates being able to shave or write a letter home. It seems of importance to draw this easily-made splint to common attention when there is increasing expectation of a more active type of warfare.

* From the Department of Surgery, No. 1 Canadian General Hospital, R.C.A.M.C.

Any study of the epidemics of this disease (polio-myelitis) shows practically world wide distribution, with especially heavy incidence in northern Europe and northern United States and Canada, and in the comparable regions in the southern hemisphere. No especial climatic or other peculiar conditions are essen-

tial for the spread of the disease, but both sporadic and epidemic prevalence reach the maximum during the late summer and early autumn months, with the lowest point in midwinter. Yet winter epidemics have occurred even beyond the Arctic circle.—Paul F. Clark, *Infantile Paralysis*, p. 5, National Foundation for Infantile Paralysis, New York.

Editorials

ENCEPHALITIS*

THE war against disease seems to be a never-ending conflict. Medical science no sooner disposes of one enemy than another raises its head. One of the latest threats to the health and security of mankind is Western equine encephalitis. We have had other outbreaks of encephalitis, particularly the so-called lethargic encephalitis. These, which made their appearance in the years following the first Great War took a considerable toll in death and disability.

All evidence indicates that the encephalitis in humans in Western Canada during the past few years has some direct or indirect connection with the disease encephalomyelitis in horses. In the Western Provinces and States, this disease in horses is an old story. In the equine population outbreaks have been reported since 1847,¹ and in 1937, it reached truly epidemic proportions. Geographically, it covered the whole of the Central American plain or spring wheat area, and during 1937, in Manitoba alone approximately 12,000 cases occurred in horses, which was 9% of the total horse population. The mortality rate reported was 27%. A similar smaller outbreak in this Province occurred in 1938 and in the same year cases of encephalitis were reported amongst humans. In the few cases reported, a history of some contact with sick horses could almost always be elicited. Cases continued to be reported in man in scattered areas throughout the Western Provinces in 1939 and 1940, but it was not until late July in 1941 that it was evident that we were in for a widespread and severe epidemic. The epidemic itself was short and sharp, the peak being reached within three weeks of the onset and the disease practically disappearing during the course of the following month. In all, a total of 509 cases was reported in Manitoba during the year, with a death toll of 78; a case fatality rate of 15.3.

This disease appears to be primarily a

disease of working males whose occupation keeps them outdoors. In other words, the 1941 epidemic was predominantly a rural disease amongst the male farming population of twenty years of age and over. It reached its peak and created its greatest havoc during the height of the harvest season and as a result interfered considerably with the harvest operations. From information on hand it would appear that at least 150,000 man-hours of work were lost on Manitoba farms during 1941 as a result of this epidemic.

As to the end results of recovered cases, it is too soon to say what these will be, but studies of cases one year after the onset of the disease indicate that a very considerable percentage show some disability. A follow-up of this whole group of cases for at least a period of three or four years will be required before any definite answer can be given as to the total disability likely to be caused by this epidemic. An indication of what may be expected is well brought out by Captain Harry Medovy, when he reports that out of 19 cases in infants studied by him, 6 have developed sequelæ ranging from spasticity to definite mental retardation.² Information obtained on cases which occurred in the personnel of His Majesty's Forces reveals that approximately one-third of all those who had contracted the disease in 1941 have since been discharged as medically unfit. Fortunately, the number of cases in the Army and Air Force was small.

What the future holds in store is hard to say. We have no previous experience on which to base an opinion and one can only judge what may happen by studying the results of other neurotropic virus diseases such as poliomyelitis. If we use this as a pattern to try to predict what we may expect in the future in respect to encephalitis, one would think that for three or four years following the epidemic in 1941 we would have a diminishing number of cases reported, after which time cases reported would tend

* Contributed by Dr. F. W. Jackson, M.D., D.P.H., Deputy Minister, Department of Health and Public Welfare, Manitoba.

1. CAMERON, G. D. W.: *Canad. Pub. Health Ass. J.*, August, 1942.

2. MEDOVY, CAPT. H.: *Canad. Pub. Health Ass. J.*, June, 1942.

to increase until another epidemic appeared. One would expect that the time between the peak incidences of the disease in any given community would be between six and ten years. On the above basis we expected to have approximately 200 cases in Manitoba in 1942, as well as possibly 250 cases of poliomyelitis, but fortunately for some unforeseen reason no appreciable increase in the incidence of either disease has made its appearance as yet this year.

The means by which the disease reaches man from horses still remains to be determined. Practically one hundred per cent of cases investigated give a history of exposure to mosquitoes and of over-exertion. If one or more varieties of mosquitoes are the vectors and all evidence suggests this, we still have to determine if the virus is carried directly from the host (horse or other animal or bird) to man.

A considerable amount of research work trying to find a vector or vectors and hosts of the virus is being carried on by the Departments of Health of both Saskatchewan and Manitoba. In both instances co-operation and great assistance is being given by the Department of Agriculture and the Department of Pensions and National Health of the Dominion Government³.

One hopeful sign in respect to the whole matter of control of encephalitis is, that if the experience of Departments of Agriculture in the protection of horses is any criteria, we

may have an effective preventive vaccine for man. The vaccine for the control of encephalomyelitis in horses which has been used for some four years in the West appears to have an immunizing power capable of practically one hundred per cent immunization of horses. A similar type of vaccine is now being experimented with on humans, and although it is too soon to say what the results of this immunizing experiment will be, it would appear from the information now available from the immunizing of laboratory workers and other groups that the vaccine used for protection of humans has the power of producing neutralizing "antibodies" in the blood of the person immunized. Whether or not this will protect against the infection itself, of course, remains to be seen.

The epidemic in Manitoba was only a part of a large epidemic which took in the States of Minnesota and North Dakota, as well as the Provinces of Saskatchewan and Manitoba, there being a total of 2,792 cases reported in this epidemic area during 1941, with an attack rate of 55 per 100,000 population, and a case fatality rate of 12.4⁴.

One must conclude, therefore, that insofar as the farming communities of Western Canada are concerned, this is a serious disease and every effort of medical science available in these strenuous times should be brought to bear on methods and means by which its ravages may be controlled.

F. W. JACKSON.

3. DAVISON, R. O.: *Canad. Pub. Health Ass. J.*, August, 1942.

4. DONOVAN, C. R. AND BOWMAN, M.: *Canad. Pub. Health Ass. J.*, June, 1942.

WORK OF THE FISHERIES RESEARCH BOARD

THE Annual Report of our Fisheries Research Board for 1941 points out that the work of the Board has necessarily been directed largely toward war-time problems, but progress has also been made in work of general value. We note particularly the successful efforts being made to deal with materials whose source has been affected by the war. For example, a great demand has arisen for Irish Moss (a sea-weed). This is due chiefly to the cutting off of European supplies. Sources have been found in Nova Scotia and Prince Edward Island and it is felt that the industry may be built up on

permanent foundations. The amount collected in earlier years was less than 10,000 pounds. This was increased to about 200,000 pounds in 1941, and it is expected that this figure will be greatly exceeded in 1942. The market for it is largely in the United States.

The work being done with regard to cod-liver oil is still more extensive. Previous to the war the greater part of our supplies of this oil was imported. With the fall of Norway we were thrown entirely on our own resources, which, it may be added, lacked nothing but fuller development. Here again, the work now being done should place the

industry on a permanent basis. The chief problem at present is the method of recovering the oil from fish livers. In the case of fish caught near shore the recovery of the oil presents no great difficulty, except perhaps with regard to waste. These livers are cooked by steam and the oil which floats to the surface is skimmed off. With fresh livers, as these usually are, the oil is of high quality. But there is a considerable residue and this is treated by pressing, which leads to exposure to air and bacterial contamination, resulting in an oil of low quality; and even then, all the oil is not recovered. Methods of fine disintegration of this residue with accurate control of the pH have been found to give much better results both in quality and quantity.

Most of our cod, however, is caught at sea by schooners and trawlers, and since these boats stay at sea for long periods the problem of preservation of the fish has to be faced. Cod-livers are very perishable. So far the oil from these sources has had an objectionable odour and flavour on account of this decomposition of the livers, although the vitamin content is still high. Attempts to

use preservatives on board these boats have not been very successful as the penetration into the fat livers is slow. But a method of overcoming this is being worked out. For the present then a good deal of the cod-liver oil whilst still of high vitamin potency, will be unpleasant in taste and odour. In this respect it has been found that steam distillation under reduced pressure and a temperature of 180° F. will deodorize the oil. It is hoped by this means to reclaim a large volume of this oil. This treatment not only removes odours but takes out much of the dissolved oxygen, with a distinctly beneficial effect on the stability of the vitamin A.

On the Pacific Coast it has been shown that one type of dogfish liver is a fruitful source of vitamin A, and further investigation shows the vitamin to be concentrated at one end only of the liver. Knowledge of these facts has added greatly to the value of dogfish liver in British Columbia.

It is extremely gratifying to learn that this Board continues to carry on work of such national importance, in spite of the manifold difficulties of the times.

Editorial Comments

The Excessive Use of Artificial Vitamins

The rapid and steady rise in the sale of vitamin products on this continent generally has brought up certain points for discussion. For example, is it likely that any of these products are questionable on the score of their content? This is not held to be a real danger. With reputable firms the question of course does not arise. A problem which does seem to be developing is that of the wasteful use of vitamins. It is true that excess amounts of vitamin may not be dangerous, except perhaps in quantities which would only very rarely be taken. But apart from the uselessness of excess quantities the matter of waste ought to be considered. We are informed that already some difficulty is being experienced in obtaining adequate quantities of some of the vitamins, especially riboflavin, for use in the armed forces. This may

well lead to some degree of restriction in their sale to the general public.

Another point to be considered is that vitamin preparations do not meet ordinary requirements either in their content or in their balance. This is particularly the case with the vitamin B group. This had been forcefully pointed out recently by Dr. Roger J. Williams (*J. Am. M. Ass.*, 1942, 119: 1) whose analysis of a number of commercial vitamin preparations showed a striking lack of balance of the constituents as compared with food sources.

It is probable that eventually the indiscriminate and excessive consumption (and prescription) of artificial vitamin preparations will be replaced by a more reasonable use. We can bring that about sooner by making clear to the public that they should in ordinary life look to natural foodstuffs as the best source of this essential factor in nutrition.

Medical Economics

THE PRINCIPLES OF HEALTH INSURANCE

By T. C. ROUTLEY, M.D., LL.D., F.R.C.P.(C)

*General Secretary,
Canadian Medical Association*

In the supplement to the September, 1942, *Journal*, those who may be interested will find in the report of the Executive Committee to General Council a very illuminating statement in respect to health insurance. Every member of the Association is urged to read and study this report. It will be observed that conclusions were drawn after upwards of 3,000 medical practitioners had spoken, and of even greater significance is the fact that approximately 90% of all votes cast were in favour of the adoption of principles which, over a period of ten years, had been studied and revised by the Association and its component parts.

On July 17th, the Association's Committee of Seven (the Health Insurance Committee) held a joint conference in Ottawa with the Advisory Committee on Health Insurance established by the Dominion Government, for the purpose of presenting and discussing the twenty principles which may now be regarded as the Magna Charta of the Canadian Medical Association in respect to Health Insurance. Your representatives assured the Advisory Committee that the Association had but one desire, namely, to co-operate with constituted authority in devising plans which would provide the best possible medical service for the people of Canada. The Canadian Medical Association is not sponsoring health insurance or any other "group plan" of practice, but the Association believes that it has a duty to perform in offering its best advice to any Government, (National or Provincial) which undertakes to promulgate a health insurance scheme. Moreover, by an overwhelming majority vote, the medical profession authorized the Association to take such action.

We were well received by the Advisory Committee under the chairmanship of Dr. J. J. Heagerty, who assured us that his committee had no preconceived notions about health insurance and no pet schemes to be projected into an Act, but that each member was anxious to see a plan devised which would be as nearly perfect as it could be; and realizing the paramount importance of the medical profession in the working of a health insurance plan, the committee was desirous of having the views of organized medicine as well as our practical help in studying and formulating a plan. Proceeding with the conference, it was agreed that our committee in presenting the Association's

twenty Principles would elucidate them one by one and answer any questions that might be asked by members of the Advisory Committee.

As it is extremely important that there be as widespread an understanding as possible within the profession with regard to health insurance principles adopted by the Canadian Medical Association, it is proposed to set them down here, together with explanatory notes such as your committee tried to present to the Advisory Committee. Let it be emphasized again that the enunciation of Health Insurance Principles is not the formulation of a Health Insurance Act but should be regarded as the framework or the planks around which and out of which an Act may be built. As has already been stated, the Canadian Medical Association is not advocating health insurance or proposing any draft legislation. Our terms of reference are to offer our co-operation to constituted authority when and if invited to do so and to advocate the adoption of the following principles:

1. That in the Provinces where Health insurance is established it be administered under an independent Health Insurance Commission, the majority of whom shall be representatives of organized medicine. There should be close co-operation between this Commission and the Provincial Department of Public Health with a view to making full use of preventive services.

This is one of the most important principles enumerated. What is health insurance? What does it mean? Who are the people most vitally concerned?

Health insurance is not state medicine. Let us be very clear about that at the outset. Health insurance is a plan whereby money is collected, usually from the employer, the employee and the State and set aside as a fund out of which those who render services to the insured population are paid.

"State Medicine" (as very well defined by the American Medical Association) "is a form of medical treatment provided, conducted, controlled or subsidized by the federal or any State (provincial) Government or municipality, excepting such service as is provided by the Army, Navy or Public Health Service, and that which is necessary for the control of communicable diseases, the treatment of mental disease, the treatment of the indigent sick and such other services as may be approved by and administered under the direction of or by a local medical society and are not disapproved by the medical association of which it is a component part."

Stated in another way, health insurance is a plan whereby all who are qualified to participate in the benefits pool sufficient funds to meet the costs of illness, the greater portion of which is required to pay the doctors' bills. Next, therefore, to those who are the insured population, the doctors have by far the greater stake in the plan.

It is the doctor who must render the service to the individual and, so far as it is possible to prevent it, there should be no interference with the patient-doctor relationship as we now understand it. The administration of any health insurance scheme should be completely divorced from political control or influence, and be placed in the hands of an independent Commission, the majority of whom should be doctors appointed by organized medicine. This is more likely to give satisfaction to the insured population and those who render them service than any other plan of administration of which the Association has knowledge.

There is of course no thought in our minds that the splendid Public Health Departments now functioning in Canada should be interfered with. On the contrary, it is our view that there should be the closest possible relationship between preventive and curative medicine if complete health supervision and adequate medical care are to be guaranteed. There does not appear to be any sound reason why the two should not work together in perfect harmony, as each has exactly the same object in view, namely, the optimum amount of health for the optimum number of people.

2. That a Central Health Insurance Board and Local Insurance Boards be appointed, representative of all interested, to advise the responsible administrative authority.

This requires but little elucidation. Certainly all participants in the scheme should have a voice in its management, and local and central Advisory Committees representing all interests, should be provided for. This is of particular interest to the insured as it guarantees to them an opportunity to voice criticisms and suggestions whenever and wherever they feel justified in doing so.

3. That the professional side of health insurance medical service be the responsibility of the organized medical profession through the appointment of a Central Medical Services Committee and Local Medical Services Committees, to consider and advise on all questions affecting the administration of the medical benefit.

It is doubtful if any group of persons will raise any serious objection to this. On the other hand it is the duty as well as the privilege of the medical profession to assume responsibilities which only the profession is qualified to undertake.

4. That the question of the establishment of local areas for health insurance administration be left to the decision of the individual Provinces.

Presuming that health insurance administration will be broken down into provincial or geographic areas, it would seem reasonable to permit each administrative area considerable latitude in determining local boundaries for administrative purposes. For example, it might be found advantageous in some Provinces to disregard municipal boundaries in establishing local administrative areas and the decision in such matters should be left to the Commission in charge.

5. That the whole Province be served by adequate Departments of Public Health, organized where possible on the basis of provision of individual health supervision by the general practitioner.

This Principle has evoked perhaps more discussion, and, in many instances, more misunderstanding among our own profession than any other. Over the years, there has been a tendency for preventive medicine (public health as commonly called) and curative medicine (the rank and file of practising physicians) to separate, with an ever widening margin between them. How frequently we speak of public health as if it were something apart from the practice of medicine. Without going into the reasons for this situation or endeavouring to place responsibility for the *status quo*, it should be stated with emphasis that medicine, like any other properly built house, should not be divided, and no health insurance plan which would tend to divide us still further would be in the interests of the people or the profession. Every medical practitioner should be a public health practitioner. At heart he is, but the tendency has been to leave to others certain forms of practice such as inoculations, toxoiding, vaccination, etc., particularly where there are available personnel specially trained in preventive procedures. It is not proposed, as has been stated elsewhere in this discussion, to disturb public health *but* (and this is the crux of the whole matter) it is expected that the general practitioner—the family doctor—will consider himself a public health doctor with respect to the people who come under his care. Working in closest co-operation with the public health departments, the health of the people should be more adequately protected, and surely the main and first objective of any health scheme is the maintenance of health and the prevention of disease.

6. That "Regional Medical Officers" to act as supervisors and referees, be appointed, paid and controlled by the Commission.

Administration to be successful must be as strong at the periphery as at the centre in any

far flung organization. Regional medical officers will be needed and they should have power to carry out their duties without fear of being dismissed by a local board perhaps overly persuaded by a group of disgruntled persons who might have sufficient influence to make their weight felt.

7. That medical care for indigents and transient indigents be provided under the Plan, the Government to pay the premiums of the indigents who then receive medical care under exactly the same conditions as other insured persons.

The doctor, like any other citizen, has the right to dispense charity as he sees fit. Far too long has it been taken for granted that the indigents as a class were to be the recipients of free medical care at the hands of a benevolent profession. Organized society has apparently held this view, as it is only in recent years, since the load on the doctors became intolerable, that Governments (local and provincial) have made any real attempt to pay for the medical care of the indigents.

The poor we have and, presumably, always will have with us. They are the care of all the State, not just a few persons who render them service.

Health insurance cannot be regarded as sound in principle if it leaves on the doctor's doorstep one section of the community which has not the ability to pay for its medical care.

8. That the Plan be compulsory for persons having an annual income below a level which proves to be insufficient to meet the costs of adequate medical care.

If we are to have health insurance it must be planned to protect those persons who need it most. The provident will try to pay their bills but the improvident never. Voluntary health insurance will not apply to the improvident for the simple reason that they will not purchase it. Therefore, the plan must be compulsory for all whose income is deemed to be insufficient to pay for the costs incidental to illness.

9. That the dependents of insured persons shall be included in the medical benefits.

Again, the plan must cover all who need it. Piecemeal health insurance which leaves out of medical benefits the breadwinner's children would be a poor comfort to the worker.

10. That the only benefit under the Plan be the medical benefit.

Put in other language, this principle implies that the medical benefit includes all services incidental to medical care but does not include

cash benefits. Cash benefits do not belong to health insurance. It is readily admitted that a family when sick requires money perhaps more than a family which is well, but it does not follow that the two things should be incorporated in one Act. Cash benefits may be included in unemployment insurance, or, if necessary, in some other Act devised for the purpose.

11. That the medical benefit be organized as follows:

- (a) Every qualified licensed medical practitioner to be eligible to practise under the plan.
- (b) The insured persons to have freedom of choice of medical practitioner and vice versa.
- (c) The medical service to be based upon making available to all a general practitioner service for health supervision and treatment of disease.
- (d) Additional services, to be secured ordinarily through the medical practitioner.
 - (1) (a) Specialist medical service.
 - (b) Consultant medical service.
 - (2) Visiting nurse service (in home)
 - (3) Hospital care.
 - (4) Auxiliary services—usually in hospital.
 - (5) Pharmaceutical service.
- (e) Dental service, arranged direct with dentist or upon reference.

Careful examination of the clauses enumerated in this principle will disclose that the service is wide and complete, allowing for the participation of all persons required to provide that service.

The principle, none the less, has given rise to considerable discussion and debate within our profession, particularly clause (d). Many of our colleagues have asked, "Does this mean that the insured person cannot go to a specialist without being referred to him by a general practitioner?" Basically, that is what it does mean but the use of the word "ordinarily" takes on a very important meaning in the clause. Granted that all insured persons have a family doctor (general practitioner) it would follow that the family doctor would refer to a specialist all cases which in his judgment require the services of a specialist.

But what about the person who gets a piece of steel in his eye, or the patient who believes that he or she definitely requires surgical treatment? Will they, must they go to the family doctor before being seen by the specialist? Frankly, this is one principle with which the profession throughout Canada has wrestled and it is one which requires further thinking and clarification. However, it will be admitted that indiscriminate moving about from doctor to doctor if left uncontrolled, would constitute an abuse of the funds which of course must not be allowed to occur.

12. That the insurance fund should receive contributions from the insured, the employer of the insured and the Government.

(a) Payment of the premium of the insured, in certain proportions to be determined, should be made by the employee, employer and Government.

(b) Where an insured person has not an employer or where it is not practical for the Government to collect from the employer, the Government should pay in for that insured person what would be the employer's share as well as its own share of the premium.

(c) Where the insured is "indigent" or has been out of work long enough to come within the scope of the provisions of the Act as relating to an insured employee, the Government should assume payment of the full premium.

It might be argued that it is of no concern to the medical profession how the fund is made up so long as it is sufficient to meet the bills. Perhaps so; but surely there can be little objection taken to our citing what we believe to be a well-balanced method of collecting funds for the plan.

13. That the medical practitioners of each Province be remunerated according to the method or methods of payment which they select.

Health insurance as practised in many parts of the world permits of payment to doctors in several ways: contract; salary; or contract salary; fee for service; capitation; or a combination of two or more of these.

Believing that health insurance administration in Canada will most likely be a Provincial matter, it is our view that the medical profession in each Province should be permitted to decide upon which method, or combination of methods of payment it chooses. Each method has many advocates; and some doctors speak in very glowing terms of the method in vogue in their respective countries. Be that as it may; the medical profession of Canada is quite capable of working that problem out for itself and it is quite conceivable that all the Provinces may not adopt the same plan. Trial and error is still a very satisfactory formula and the widest possible liberty should be given the medical profession to work out this problem for themselves.

14. (a) That the schedule of fees in any health insurance scheme shall be the schedule of fees accepted by the organized profession in the Province concerned.

(b) That all schedules of fees be under complete control of the organized medical profession in each Province.

Fee schedules should be devised and controlled by the medical profession. To permit of any other course would open the scheme to dangerous interference from persons unqualified to determine a matter which comes strictly within the purview of the profession.

15. That the contract-salary service be limited to areas with a population insufficient to maintain a general practitioner in the area without additional support from the Insurance Fund.

This principle may be said to come into conflict with Principle 13, but a more careful examination will reveal that it does not. There are areas in Canada where the local authorities engage a doctor on a salary basis, the salary being determined by the local authorities. (The doctor does not say how he will be paid.) This closely approximates state medicine. Indeed some say it is state medicine. However that may be, the Association takes the view that this form of practice should not be condoned or approved unless the area is so sparsely populated that a health insurance practitioner could not make a living there.

16. That no economic barrier be imposed between doctor and patient.

This means that there is to be no money transaction between patient and doctor. It has been argued that the insured should be obliged to pay something for a first call or night call or medicines, as a brake against abusing the scheme. Whether or not such provisions are incorporated in the Act is a matter for very careful consideration. Certainly, the doctor does not wish to be put in the position of having to collect money from the patient. Moreover the introduction of additional payments beyond insurance premiums would likely tend to curtail the service.

17. That the best possible standard of service be required of the professions and that the remuneration of the professions be consistent therewith.

This principle should really be placed at the head of the list rather than in 17th place. It should be regarded as the alpha and omega of any health insurance plan. Critics of health insurance have emphasized over and over again their belief that the scheme under review did not provide adequate medical care primarily because it did not pay for it. In other words, "You get what you pay for". Canada should insist that, if health insurance comes, it should make provision for optimum service for optimum health, and be ready and willing to pay for it.

18. That provision be made for clinical teaching material for medical schools; that facilities be provided for research work; and that time be allowed for postgraduate work.

No one who knows anything about the subject will deny the necessity for the three things enumerated in this principle, if the country is to continue to enjoy the type of medical service now available.

19. That the plan be actuarially studied and approved before being adopted, and actuarially checked at periodic intervals.

Again it may be said that this is a matter somewhat beyond our competency to advise. On the other hand, when once the country embarks on health insurance it is unlikely that it will abandon it. Forty countries have instituted health insurance and as yet none has given it up. Surely the doctor has some concern that the plan be financially sound, because, if it be not, it is the medical profession who

will be asked to carry the burden by accepting a lower remuneration for their services.

20. That some plan be devised for the provision of pensions for medical practitioners.

If health insurance should prove to be acceptable to the Canadian people and become applicable to the great majority of them, the medical profession will most naturally derive the greater portion of their income from this type of practice.

Health insurance advocates refer to the plan as one of outstanding merit amongst all social security measures. The doctor is interested in security, too. He must plan for his old age and the insurance fund should help him to do so one way or another. It is immaterial by what method a retiring allowance is set up so long as the fund provides for it.

Retrospect

THE ETIOLOGY OF PHLYCTENULAR OPHTHALMIA*

By S. H. McKEE

Montreal

The article begins with a historical sketch of the subject, followed by a very elaborate review of the literature to date. The author then takes up the details of his personal investigations, which were all carried out at White Oak Hospital, a hospital school of 364 beds, under the control of the London County Council, serving children with eye affections, requiring prolonged treatment. The upper age limit for admission is 16 years.

With the giving way, during the eighteenth century, of the conception of external ophthalmia, to more detailed clinical entity, a form of keratoconjunctivitis emerged in which nodular reactions formed a prominent feature. This is clearly brought out by St. Yves in his classical textbook of 1722, and a phlycten is well shown in a plate in Wardrop's *Essays on the Morbid Anatomy of the Human Eye*, which appeared in 1808, and laid the basis of ocular pathology.

There is no *a priori* reason for the accuracy of the widespread assumption that the phlycten—a nodular reaction in the conjunctiva or cornea—must have only one exciting cause. In fact, localized reactions of the phlycten type occur against a background of generalized conjunctivitis, in a number of etiologically distinct conditions, such as Koch-Weeks and Morax-Axenfeld conjunctivitis. From his review of the literature, the author states that within living memory phlyctenulosis has declined greatly;

also, that there is general agreement from a large amount of material available, that phlyctenulosis is essentially a disease affecting children and young adults. Also, the incidence of phlyctenular ophthalmia falls heavier on females than on males. This was well recognized by the older observers.

An increase in the incidence in Spring has been noted, though the month of maximum distribution varies in different centres. Phlyctenulosis in tropical countries appears to have clinical and possibly also histological features that differ from those seen in Europe and the United States.

Almost every possible fault in diet has been incriminated as the cause of phlyctenular ophthalmia. Enlarged and septic tonsils are regarded by some as causal factors. A growing volume of elaborate evidence is available on the significance of tuberculosis as the cause of phlyctenular ophthalmia. In so far as the tubercle bacillus has not been found in the phlycten, and in that the implantation of the organism in the conjunctiva produces a tuberculous reaction, and not a phlycten, the evidence is negative, but a mass of observations is available implicating tuberculous infection rather than tuberculous disease. Since the introduction of the Von Pirquet test in 1907, and its subsequent modifications, a high percentage of positive tuberculin reactions has been consistently reported by a number of observers. These observations are set out in table form. In his personal investigation, between the years 1925 to 1940, 1,392 children with phlyctenular ophthalmia were admitted to the hospital, boys making up 39.1%, and girls 60.9% of the total number. From the study of these cases, he believes that the heavier incidence of the infection in girls is confirmed; that there is no evidence that malnutrition, focal

*This review is taken from the Hunterian Lecture by Arnold Sorsby (*Brit. J. Ophthalm.*, 1942, 26: 4).

sepsis, and pediculosis are seen more frequently in phlyctenular ophthalmia than in blepharitis; that non-bacterial allergy is not a causal factor in phlyctenulosis. Positive tuberculin reactions were obtained in 84.8% of all phlycten cases, and in 81.7%, in phlycten cases under the age of six years. The corresponding incidences in blepharitis cases were 15.3%, and 8.0%. Radiological evidence of tuberculosis was present in 72.2% of the phlycten cases. Clinical tuberculous was seen in 6.4% of phlycten cases, against no cases in the control series. The family history of tuberculosis was present in 28.9% of phlycten cases, against a computed incidence of 3.7% for the normal school child population.

It is concluded that phlyctenular ophthalmia is a manifestation not of tuberculous disease, but of tuberculous infection, the phlycten making its appearance only when a hyper-allergic phase is present and there is a suitable (? specific) exciting factor of endogenous or exogenous origin. It is suggested that the age distribution, sex incidence, and seasonal variation seen in phlyctenulosis are best explained on the assumption that the infection is tuberculous in character. The prognostic significance of the phlycten is graver than that of a positive tuberculin reaction in a child; this is borne out by the subsequent incidence of tuberculosis and mortality from it in children previously infected with phlyctenulosis.

Men and Books

L'HÔTEL-DIEU*

By A. G. NICHOLLS

Montreal

The history of the Hôtel-Dieu is the history of Montreal. The account of it by Sœur Mondoux has appeared in time to coincide with the tercentenary celebration of the founding of the city in 1642. The establishment of the Hôtel-Dieu here is officially held to have taken place in 1644. This date, of course relates to the material elements of its structure; the spiritual germ of its foundation was evident long before. We may trace this latter to that wave of philanthropy, that concern for the sick and poor, that we now speak of as "social service", which spread over France during the first quarter of the seventeenth century, mainly owing to the efforts and example of St. François de Sales and St. Vincent de Paul. In any event the movement reached some, one would have thought, unpromising spots, the Court of Louis XIV and the circles of official and aristocratic society. This spirit of altruism bore fruit also in the heart and mind of a simple citizen of a small town in Anjou named Jérôme LeRoyer de la Dauversière. How smoothly and musically these fine old French names slip off the tongue!

This worthy man, who was a Receiver of Revenues but, apparently no financier, conceived the idea of establishing a hospital or Hôtel-Dieu dedicated to St. Joseph in his home town of LaFlèche. This, with the help of certain devout and generous friends he succeeded in doing. Even at this early date La Dauversière had a nebulous idea of founding a branch of this institution in New France, a region which was by this time beginning to attract attention at home. The whole story is vastly interesting and not devoid of a miraculous, or, perhaps, rather, we

should say, a providential setting. Sister Mondoux has devoted about one fifth of her not very large book to unravelling the somewhat tangled skein of these preliminary events, and links them ably with her primary concern, the establishment of the infant settlement of Ville-Marie and its premier hospital. We are introduced to, among others, Mère de la Ferre, the Baron de Fancamp, to Catherine Macé, Judith Moreau de Brésolles and Marie Maillet, the last three of whom were destined to play an important part in the inchoate days of Montreal; to the Abbé Jean Jacques Olier. In the developing story four figures stand out prominently, De la Dauversière, Jeanne Mance, Paul Chomedey de Maisonneuve, and Mme. de Bullion.

de Maisonneuve and Jeanne Mance were wisely chosen and admirably fitted for the task they assumed. "Maisonneuve was a great man, knightly in bearing, brave as a lion, devout as a monk." (Parkman) Jeanne Mance became known as "The Angel of the Colony." This appellation tells us much.

Mme. de Bullion, "la Bienfaitrice Inconnue", was the widow of Claude de Bullion, Superintendent of the Finances of France, who died in 1640, leaving her the mistress of a large fortune. She expended much of this on works of charity and, notably, in the establishment of the Hôtel-Dieu of Montreal. Hospitals, even small ones, are expensive luxuries and require much in the way of funds. The money was mainly supplied by Mme. de Bullion, whose charity and generosity made it possible for La Dauversière's dream to come true.

Sister Mondoux has presented in a very readable form the history of her institution from its inception to the date of the British conquest. Her descriptions are taken from early documents and "The Annals" of Sister Morin in the possession of the hospital, and, we may believe, are substantially accurate. She has consulted works dealing with the history of these early times, of which there are many. One thing we gather is

*L'Hôtel-Dieu—Premier Hôpital de Montréal. Par Sœur Mondoux, \$2.50. Published privately by the Hôtel-Dieu, Montreal, 1942.

that the establishment of the Hôtel-Dieu of Montreal was beset with almost incredible difficulties and vicissitudes. That success was finally achieved speaks volumes for the faith, zeal, and hope of the little community. Opposition in high places, Indians, wars, floods, fires, earthquakes, and pestilences were there aplenty and they would have served to daunt the enthusiasm of any but the most intrepid souls. Also we must add the handicap of chronic poverty, with all that entailed. Sometimes things were so difficult that the sisters had hardly enough to eat and were so short of cloth that they were unable to renew their clothing. The reason given for this is that supplies which they had been expecting from France had gone to the bottom of the sea—a rather modern touch, one might say.

Not the least of their woes was that on gala days the friendly Indians prepared a savoury dish called *sagamité* of which the whites were expected to partake. This delectable viand was composed of "un minot et demi" (about sixty litres) of Indian corn, some pieces of beef, two good fat dogs, two good fat cats, and some beef dripping, the whole boiled together for hours. The record continues, that this concoction was "excellente à leur gout et non au notre." Many other incidents are described which add colour to the narrative.

We are informed about the efforts made to establish religion and education among the natives and are introduced in due course to the Gentlemen of St. Sulpice, the Seigneurs of the Island of Montreal, the Congregation of Notre Dame, both of which organizations united their efforts with those of the Hospitalières of the Hôtel-Dieu to improve the primitive conditions that existed. The first mentioned of these organizations was devoted to the service of the Christ Child, the second to that of the Virgin Mary; and the third to that of St. Joseph. Thus was fulfilled a dream of La Dauversière that the young colony should in a special way be representative of the Holy Family.

Sister Mondoux's book is rendered more valuable by the presentation with dates of many important personages connected with the hospital—founders, sisters, chaplains and others. The names of the medical men domiciled in Montreal in these early days have for us a special interest.

When Maisonneuve arrived at Tadoussac in 1641, where he had taken refuge after a stormy passage, he found himself without a surgeon, his own, apparently, having died on the way. Admiral Courpon, who was in charge at this outpost, generously allowed his own surgeon to enter the service of Maisonneuve. This man's name was Jean Poupée. He almost certainly, has the distinction of being the first medical man to be established in Montreal. He must, at least, have remained with the infant colony for some time, for his name is appended to a document there in 1648. Probably, too, he should be regarded as the first surgeon of the Hôtel-Dieu.

Louis Goudeau, called in a deed dated January 4, 1648, "Maitre Chirurgien de Ville Marie," possibly, should divide this honour. Among the rest may be mentioned Etienne Bouchard, who was engaged by the Company of Notre Dame of Montreal in 1653 as surgeon to Ville Marie under the orders of Maisonneuve. He it was who attended Jeanne Mance when she broke and dislocated her wrist in 1657; Jean Martinet de Fonblanche, engaged by the hospital in 1681. He is said to have introduced the apprenticeship method of teaching medicine. Dominique Thaumur de la Source, who treated his celebrated confrère of Quebec, Michel Sarrazin, in 1692; Timothée Silvain (Timothy Sullivan, born in Ireland), a notable figure of the time, related through his wife to Mère d'Youville, who assisted in reviving the hospice of the Charon brothers, which became eventually the convent of the Grey Nuns.

Sister Mondoux's theme is treated interestingly throughout and her book is well documented and well produced. There are numerous illustrations, three in colour—Mme. de Bullion, the town of LaFlèche, and the port of La Rochelle. Besides, there are several full-page portraits of notable personages mentioned in the text and many cuts of historic and antiquarian interest, as well as maps of the old city, fac-similes of documents and signatures, and the like. Even the tail-pieces have their appropriateness and artistic charm. Altogether, a work to be thoroughly studied and understandingly perused. It reminds us of that excellent work of Dr. J. K. Foran on "Jeanne Mance" published in 1931 in English. The two books may in large measure be regarded as complementary.

CATECHISM IN MEDICAL HISTORY

By HEBER C. JAMIESON,

Edmonton

QUESTIONS

1. What necessary link was missing in Harvey's conception of the circulation of the blood and who supplied it?
2. What Italian anatomist had a statue erected to him as the real discover of the circulation?
3. A mortar and pestle used to be the sign of a drug store. Before this the bust of a famous chemist was used as a sign for nearly two hundred years. Whose was it?
4. A well-known London surgeon of the eighteenth century wrote a description of a fracture he himself sustained. It still bears his name. Who was he?
5. Who wrote the "Physician's Pulse Watch"?
6. The following is supplied by Dr. A. F. McKenzie of Monkton, Ontario.
Conan Doyle in one of his short stories (*A Medical Document*) says, "Medical men

- are as a class very much too busy to take stock of singular situations or dramatic events. Thus it happens that the ablest chronicler of their experiences in our literature was a lawyer." To what writer and writings does he refer?
7. When was clinical thermometry introduced into Medicine?
 8. In the fourteenth century surgeons were divided into those of the short robe and those of the long robe. What was the difference?
 9. When was the term "Doctor" as we now know it first introduced?
 10. What name was given to the early apothecaries?
 11. What adjunct to medical practice obtained a great vogue in the Middle Ages due to a mistranslation of a word in a work of Hippocrates?
 12. What is the origin of the term "the remains" as applied to the dead human body?
 13. What sixteenth century explorer in Canada was given a cure for scurvy?
- 1798 who carried it into practice in "Medical Reports".
 8. The surgeons of the short robe were the barbers who practised surgery. The surgeons of the long robe were the consulting and operating surgeons.
 9. About the year 1200 by Gilles of Corbeil to masters of Salerno.
 10. Sandalwood dealers, because they dealt mostly in spices.
 11. Astrology. The word "divination" was rendered "ecceste".
 12. It was first used by a clergyman early in the nineteenth century during the burial service after an autopsy had been performed on the corpse.
 13. Jacques Cartier in 1535 told an Indian chief about scurvy on board his vessel. The Indian told him to use a tea called "Anceda" (made of spruce tops), which cured his seamen.

ANSWERS

1. Harvey did not see the capillaries. These were discovered by Malpighi (1661).
2. Realdus Columbus (1516-1559). He was the first to demonstrate that blood passed from the lungs into the pulmonary vein. Some authorities doubt this. He is charged with stealing the work of Miguel Servetus (1509-1553).
3. That of Johann Rudolph Glauber (1604-1688). He discovered sodium sulphate (Glauber's salt), made sulphate of copper, arsenic chloride, and zinc chloride. Glauber was the leading analytical chemist of his time.
4. Percival Pott (1714-1788). He also wrote classical descriptions of spinal caries, hernia, fistula in ano and hydrocele.
5. Sir John Floyer (1649-1734), an Englishman. He introduced a watch that ran for exactly one minute. The value of this book was vitiated by the revival of old Galenic specific pulses; i.e., a special pulse for every disease. Dr. Weir Mitchell says that "it was not till a later day, and under the influence of the great Dublin school, that the familiar figure of the doctor, watch in hand, came to be commonplace."
6. Doyle no doubt here refers to Samuel Warren, who studied medicine at the University of Edinburgh but abandoned this to study for the English bar. His "Passages from the Diary of a Late Physician" appeared in *Blackwood's Magazine* in serial form from August 1830 to August 1837 and in book form in 1838.
7. George Martine (1702-1742), a Scotsman, suggested it, but it was James Currie in

Medical Societies

La Société Médicale de Montréal

La Société Médicale de Montréal prenait récemment l'initiative de constituer un Comité d'études sur "la poliomyélite", lequel s'est réuni, à plusieurs reprises, sous la présidence du docteur Edmond Dubé.

À la dernière réunion de ce Comité, le docteur Paul Letondal suggéra d'organiser à l'hôpital Sainte-Justine pour les médecins de langue française de la métropole, une séance spéciale, dans laquelle serait exposé ce que tout praticien doit savoir, à l'heure actuelle, sur la paralysie infantile.

Cette suggestion a été favorablement accueillie, si bien que le mardi 1er septembre avait lieu à l'hôpital Sainte-Justine, sous la présidence du docteur G.-L. Prud'homme, une réunion entièrement consacrée à l'étude de la poliomyélite. Le point de vue clinique fut étudié par le docteur Jean Saucier; le point de vue physiothérapique, par le docteur Albert Comtois; le point de vue orthopédique, par les docteurs Edmond Dubé et Gaston Caisse.

À l'issue de la séance, une démonstration pratique de la méthode de Kenny fut donnée par Mlle M. Hepworth.

Au delà de 150 médecins de la métropole et environs s'étaient rendus ce soir là, à Sainte-Justine, pour se renseigner sur les acquisitions récentes concernant la poliomyélite, et plus particulièrement sur la méthode de Kenny qui compte, à l'heure présente, de plus en plus de partisans, non seulement en Australie, mais également en Amérique.

The General Secretary's Page

How frequently one has heard it said, "*Why don't you tell the profession what goes on in The Canadian Medical Association? We would like to know*". Yet, I venture to think that many of our members merely flicked over the pages in the Supplement to last month's *Journal*. Perhaps some didn't even do that, but passed the annual reports by without a look.

Reports are dry reading, I hear some one say. Yes, they are, but who wants them to be other than that. They burn better when they are dry, and some of them may at times be worth burning into one's memory. There is a great deal of interesting and useful information in this year's reports. For instance, examine carefully the section in the Report of the Executive Committee on Health Insurance. You will observe that certain principles have emerged after ten years of thinking, principles which apparently 90% of Canada's doctors believe to be sound and worthy of incorporation in any plan of health insurance which may be devised for the nation. If you take time to study this report as it should be studied, and to examine and comprehend the meaning of each principle, you will have a clear conception of the position taken by the Association on your behalf, in connection with one of the most vital questions facing organized medicine today. Don't just brush it aside as something which may never concern you. It certainly will be a concern of Canadian doctors some day and what concerns the profession tomorrow is the responsibility of the profession today.

According to the press, one of Canada's major political parties held a conference recently in Port Hope. What authority, if any, this conference had for setting up a political platform one cannot say, but certain recommendations did emerge, among which, as reported in the newspapers, is the following:

"A program of state medicine, because we recognize the obligation of Government to make available to every citizen adequate medical, dental, nursing, hospital and prenatal care so that health may be safeguarded and preserved. To this end we advocate a national contributory and equitably financed system of state medicine including the further advancement of public health and nutritional principles and their practical application."

Two or three observations, it seems to me, are in order:—First, we see the trend of thinking and that trend is very apparent today in all political parties in Canada.

Secondly, we note once again, as is observed so frequently in public discussions, confusion between the terms state medicine and health insurance. Presumably, the framers of the resolution were thinking of health insurance when they referred to "a national contributory and equitably financed system"; but they start off by speaking of state medicine.

We may in the not too distant future have to deal with health insurance in this country, but certainly we do not want to have anything to do with state medicine. A program of public enlightenment on the difference between the two diametrically opposed plans might very well be carried out by the medical profession. However, we must be sure ourselves that we know the difference; and it is surprising to find a great many doctors still using the terms interchangeably as if they meant one and the same thing.

The Canadian Medical Procurement and Assignment Board met again in September and received reports from the Provinces with respect to the progress which is being made in securing medical enlistments. It will be recalled that the profession was advised that something over 800 additional medical officers would be required in the three services between July, 1942, and March, 1943. This calls for roughly 100 medical enlistments each month. At the time of writing the exact figures are not available, but it can be said that enlistments are ahead of this schedule.

Divisional Advisory Committees are contacting all the doctors under fifty years of age who volunteered to enlist, and a careful selection is being made, having due regard to the importance of the work now being performed by each doctor who has offered his services. While the medical needs of the armed services must come first, the medical needs of the civilian population, and particularly that great industrial section which is concerned in providing the instruments of war, must not be overlooked. With the help of all the Divisional Advisory Committees, the Canadian Medical Procurement and Assignment Board believes that a very useful contribution may be made to Canada's war effort. If you are willing and fit to enlist and have not been contacted in your home Province, send your name to the General Secretary who will gladly put you in touch with the committee who will advise you frankly whether to join up or stay where you are.

Correspondence

The Study of Poliomyelitis

To the Editor:

To those of your subscribers who are interested in poliomyelitis I wish to make an appeal.

Spinal cords from cases of the disease, acute and even more particularly chronic, are needed. A hopeful line of attack is being seriously hampered by lack of this material, in spite of generous co-operation from many sources. I therefore beg that anyone reading this letter will bear me in mind if the possibility of obtaining such a cord should come his way. The appeal is particularly to individual physicians and surgeons and to small hospitals which might contact isolated cases; far from being incidental, a single cord would be of major value.

Requirements are: Intact cords or intact upper or lower halves; dura left on but slit up back for good fixation; cord may be cut into equal thirds; portions of cords kept in stock are of value. Fixation preferably with 2% glacial acetic acid in 95% alcohol, but may be with 10% formalin in normal saline; about a pint; please fix straight. I shall gladly pay ten dollars for technical assistance employed in removing a cord, and shipping expenses. If sections are required for local records I prefer to prepare them myself; removal of blocks by donor impairs value of material. I shall be looking for cords at least till the summer of 1943. Correspondence is cordially invited.

Thanking you for your interest and courtesy, I remain,

Sincerely yours,

H. CHANDLER ELLIOTT.

Dept of Anatomy,
University of Toronto,
Sept. 3, 1942.

Cancer of the Breast

To the Editor

In the September number, in Abstracts from Current Literature, R. C. Burr has presented a summary of an article, in *Am. J. Roentgenol.*, dealing with treatment of Cancer of the Breast. Most of the conclusions at which this article arrives are opinions which are widely accepted; the value of radical excision for instance. It has been a long time since any enlightened surgeon has hoped to cure malignant disease by simple removal of the breast. Most surgeons, too, agree with and put into practice the opinion that radical excision alone gives better results than irradiation alone. However I think there is not such general agreement that simple mastectomy

with irradiation is undesirable compared to radical mastectomy with irradiation.

It may be of interest to some of your readers to learn that in that great teaching and surgical centre, the Edinburgh Royal Infirmary, radical mastectomy has recently been entirely abandoned in favour of simple mastectomy and irradiation. This group of famous surgeons do not claim that the latter is the best treatment. Their results five and ten years hence will show whether or not it is. But they did think, less than a year ago, that their results were being no worse by leaving the axilla untouched, and the patient had the benefit of undergoing a much less severe operation.

Yours truly,

J. R. LACROIX.

Ste. Agathe des Monts, Que.,
Sept. 7, 1942.

Precaution in Transfusions

To the Editor:

I note in your editorial comments of June, 1942, entitled "Precaution in Transfusions" the suggestion of "colouring bottles according to groups", to avoid errors in transfusing incompatible stored blood.

For your information I am enclosing blood bottle labels of different colours, corresponding to each blood group. This colour scheme is now practically uniform throughout the Regional Blood Transfusion Service of the Ministry of Health.

The label is in three divisions. The outermost is detached at the time of bleeding the donor and is affixed to the Kahn tube on which the re-checking of the group and serology is performed. The re-checking is done both by checking cells against standard grouping sera, and sera against standard cell suspensions of A and B. The second section of the label is detached at the time of transfusion and affixed to the patient's bed papers, in order that every bottle of blood may be traced and accounted for. Each label is stamped with the date on which the blood is drawn, in order that it may be used within the "safe period". While a maximum of a fortnight has been established, the general practice in this Region is to renew stocks in all our blood banks every week.

Yours sincerely,

W. S. STANBURY,
Regional Transfusion Officer.

Ministry of Health,
Leeds, 2, England,
July 6, 1942.



Special Correspondence

The London Letter

(From our own correspondent)

More about food.—The chief effects of the war on the dietetic habits of the nation have been more carbohydrate for civilians as a whole, a better diet for the poorest families and a better distribution of food stuffs as a result of rationing. This last was the topic of the most recent meeting of the Nutrition Society when a large gathering discussed particularly the problems of collective feeding. Lord Woolton, our energetic Minister of Food, in his opening address expressed his conviction that there always would be enough food to go round—the only problems being what types of food to supply and how best to prepare and distribute them. These problems are in fact being solved by the "British Restaurants", 1,400 of which have now been opened, serving 94 million meals a week. The policy of the British Restaurant is to supply in one meal a third of the day's requirements of protein and calories and two-thirds of the vitamins and mineral salts. There are many difficulties about achieving this and one is the different groups of people to be supplied, varying from factory workers to school children. The former have their own canteens in many instances—7,500 factories now have canteens as compared with 1,500 before the war. The numbers of children taking dinners in school is now rapidly reaching the million mark and in an interesting recent survey an attempt has been made to find out what children think about school meals by making this the subject of an ordinary school essay. A large proportion stated a clear preference for meals at home, but the reasons for this choice mostly revealed matters which can be improved. For example, many of the bigger boys complain of still feeling hungry after a school dinner, and probably the organizers have forgotten how much adolescents can put away! Crowding and noise at meals were also complained of—but again these are capable of correction. On the positive side were remarks about the liking for school fare, the relief from a tiring walk home and the fact that the school meals help the mothers. Careful management of this valuable new development in communal feeding in its early stages is necessary to make it the success it deserves to be.

Tuberculosis problems.—The wartime increase in tuberculosis has brought forward once again the paramount need for early diagnosis and great hopes are expressed in some quarters of the value of miniature radiography. A Royal Air Force physician recently reported that 100 cases per hour could be dealt with by this method, and it is understood that apparatus is on order both in this country and in America. Whether it will be practicable to institute radiographic examination of recruits—as it is believed is done

in the Canadian Forces—remains to be seen. Certainly the position here does not seem quite so optimistic as a recent official pronouncement which suggested that since 1% of recruits are rejected on grounds of tuberculosis after clinical examination, there remains only 1 or 2 per thousand to be picked out by miniature radiology. A recent analysis of 300 consecutive cases of pulmonary tuberculosis among service men admitted to hospital indicated moderately advanced disease in 66% and advanced disease on 10%. Nearly three-quarters of the men had had less than a year's service and in 8% the diagnosis was made within three months of enlistment. A significant history was given by 48 of the men (16%) and yet in only few instances had the recruiting medical board sought further opinion—and no x-ray examination of the chest was made. Very careful scrutiny of the x-ray films made after admission by at least two experts led to the view that in 201 cases (67%) the lung lesion could have been detected by radiology at the time of enlistment. Such a state of affairs, if at all general, and there is unfortunately no reason to suppose that it is not, is disquieting, to say the least. The newspapers comment on the Planning Commission's Report (referred to last month) that the day of the stethoscope was past is certainly true as regards the early diagnosis of tuberculosis and yet this fact seems a long time reaching those who are in a unique position to detect the disease in the young adult population.

United front against cancer.—The other scourge for which early diagnosis is essential is cancer and the Radium Commission has recently issued a valuable memorandum showing how team work can be most usefully employed to attack the cancer problem—now definitely a national obligation under the Cancer Act. Briefly the new memorandum suggests a team for an area of one million population to deal with some thousand treatable cancer cases a year. The team must include physicians, surgeons, radiotherapists, as well as pathologists and physicists with special experience in cancer work. Several hospitals in a region may have to be called on to supply the team but preferably all radiotherapy should be centralized in one institution. Remediable factors which militate against early diagnosis are set out clearly in the new memorandum, including well equipped facilities for examination, inexperience of cancer by some medical men and ignorance of the laity about the disease in its early stages. A united front will seek to get rid of these three troubles.

Social medicine.—Once again Lord Nuffield—of Morris Motors fame—is to have his name associated with a notable advance, for the Nuffield Provincial Hospitals Trust has announced the foundation of a professorship and an institute of social medicine at Oxford University. This is symptomatic of the new emphasis in medicine

on positive health rather than in negative disease and marks a step forward in the study and teaching of preventive medicine in its widest aspects.

ALAN MONCRIEFF.

London, August, 1942.

University Notes

Université de Montréal— Faculté de Médecine

ENSEIGNEMENT LIBRE COURS

DE PERFECTIONNEMENT EN PEDIATRIE

Directeur: M. le Prof. agrégé Paul Letondal

Pour la cinquième année consécutive, un cours de perfectionnement sur la *pathologie digestive du nourrisson* aura lieu du 5 au 10 octobre prochain. Cet enseignement sera donné à l'hôpital Général de Verdun, par le docteur Paul Letondal, professeur agrégé de Médecine des Enfants à l'Université de Montréal, avec la collaboration du professeur Georges Baril et du professeur agrégé Philippe Panneton, et avec le concours des docteurs Daniel Longpré, Albert Guilbeault, J.-H. Charbonneau, Albert Jutras, Paul Caumartin et J.-P. Bombardier.

Les leçons auront lieu l'après-midi, de 4 à 6 heures, dans la salle du bureau médical, et seront suivies de projections.

Pendant cette semaine, tous les matins de 9 heures à midi, dans les hôpitaux, conférences de séméiologie et de thérapeutique digestive avec présentation de malades ou démonstration pratique de laboratoire.

Ceux qui désirent suivre ce cours de perfectionnement sont priés de s'inscrire à l'avance à 418 est, rue Sherbrooke, MARquette 7334. Droit à verser: trois dollars.

Les auditeurs recevront avant chaque leçon un plan détaillé du cours et un certificat sera décerné aux médecins régulièrement inscrits.

PROGRAMME DU COURS

Lundi 5 octobre

- 4 h.—Ouverture du cours. M. Paul Letondal.
- 4 h. 15.—Les accidents de la première dentition. Les stomatites. M. J.-H. Charbonneau.
- 5 h.—L'anorexie des nourrissons et son traitement. M. Daniel Longpré.

Mardi 6 octobre

- 4 h.—Les vomissements du nourrisson. La sténose congénitale du pylore. M. J.-P. Bombardier.
- 5 h.—Exploration radiologique de l'estomac et de l'intestin dans la première enfance. M. Albert Jutras.

Mercredi 7 octobre

- 4 h.—La constipation du nourrisson. La maladie de Hirschsprung. M. Paul Letondal.
- 5 h.—L'occlusion intestinale. M. Paul Caumartin.

Jeudi 8 octobre

- 4 h.—Les diarrhées aiguës du nourrisson. La forme commune. Les syndrômes dysentériques. M. Paul Letondal.
- 5 h.—Les diarrhées chroniques. La maladie cœlique. M. Albert Guilbeault.

Vendredi 9 octobre

- 4 h.—Le choléra infantile et les états cholériques dans la première enfance. M. Paul Letondal.
- 5 h.—L'otite du nourrisson. Ses rapports avec les affections gastro-intestinales. M. Daniel Longpré.

Samedi 10 octobre

- 4 h.—Les ictères du nouveau-né. L'ictère grave familial. M. Albert Guilbeault.
- 5 h.—Les états de dénutrition du premier âge. L'hypothrepsie et l'athrepsie. M. Paul Letondal.

PROGRAMMES DES CONFERENCES CLINIQUES

Mardi 6 octobre

à l'Hôtel-Dieu

- 9 h.—L'examen clinique du nourrisson. M. Paul Letondal.
- 10 h.—Démonstration pratique de radiologie. M. Albert Jutras.
- 11 h.—Coprologie clinique. M. Georges Baril.

Mercredi 7 octobre

à l'hôpital Général de Verdun

- 9 h.—Les aliments de régime (1ère partie). M. Paul Letondal.
- 10 h.—Conférence clinique avec présentation de malades. M. J.-P. Bombardier.

Jeudi 8 octobre

à la Crèche de Liesse

- 9 h.—Les aliments de régime (2ème partie). M. Paul Letondal.
- 10 h.—Otoscopie dans la première enfance. Indications de la ponction du tympan et de la paracentèse. M. Philippe Panneton.
- 11 h.—Conférence clinique avec présentation de malades. M. Daniel Longpré.

Vendredi 9 octobre

à l'hôpital Pasteur

- 9 h.—Les médicaments. M. Paul Letondal.
- 10 h.—Conférence clinique avec présentation de malades. M. J.-H. Charbonneau.

Samedi 10 octobre

à l'hôpital Notre-Dame

- 9 h.—Techniques thérapeutiques. M. Paul Letondal.
- 10 h.—Conférence clinique avec présentation de malades. M. Albert Guilbeault.

Abstracts from Current Literature

Medicine

Pneumococcal Meningitis; A Study of Seventy-two Cases. Dowling, H. F., Dauer, C. C., Feldman, H. A. and Hartman, C. R.: *New Eng. J. Med.*, 1942, 226: 1015.

Before the advent of specific serum and the sulfonamides pneumococcal meningitis was almost invariably fatal. With these modern therapeutic agents many cases of cure have been reported, but the authors feel that the publication of these positive results has led to an over-optimism in the prognosis of this disease. To determine just how modern therapy has influenced the recovery rate, a survey was made of all the cases of pneumococcal meningitis which occurred in the District of Columbia between January 1, 1938 and October 31, 1941. The total was found to be 72, of which 14 were treated by the authors. Only four patients survived. These four were among the thirty-nine patients who were considered to have had good treatment with the sulfonamide drugs or specific serum, or both. Among the nineteen patients who were given only fair treatment, the nine patients who received poor treatment and the five patients who received no specific treatment, there were no recoveries. Among the fatal cases, those receiving good treatment survived an average of 7.5 days after diagnosis, and those receiving fair, poor, or no treatment survived an average of 2.6, 2.1 days, respectively.

With the best treatment at our disposal today, on an active medical service interested in infectious disease, the mortality rate from pneumococcal meningitis is about 80%. N. S. SKINNER

Azotemia in Gastro-Duodenal Hemorrhage.

Black, D. A. K.: *Quart. J. Med.*, 1942, 11: 77.

The blood urea is almost constantly raised with severe bleeding into the stomach or duodenum. The increase is usually moderate in degree, to about 70 mgm. per 100 c.c., but much higher values may occur. The rise in blood urea may be present within two hours of hemorrhage, is at its height on the following day and becomes completely normal in a week to ten days. The more severe the hemorrhage, the greater the rise in blood urea. While the azotemia in gastro-duodenal hemorrhage is almost entirely accounted for by the increase in blood urea, the amino-acid nitrogen is also slightly raised, but creatinine and uric acid are normal. The blood volume is usually, but not always, diminished, and may be less than half the normal amount. Urinary output is diminished for 24 to 48 hours after the hemorrhage, but thereafter excretion of urea causes a forced diuresis. The specific gravity of the urine is normal or even high, and the urea concentration is good. Albumin and casts occasionally are

found. The clearance of urea, insulin, and diiodine is diminished when the blood urea is rising, but later is normal. The nitrogen balance is positive, due to absorption from the blood in the bowel, even although loss of weight, creatinuria and increased excretion of inorganic sulphur and phosphorus suggest increased breakdown of tissue protein.

The azotemia of gastro-duodenal hemorrhage is due to two causes, increased formation of urea and decreased kidney elimination. Increased absorption from the blood in the bowel is a factor in the increased urea formation, but it is not the only one as there is probably increased tissue breakdown as well, due to loss of body fluid or circulatory changes producing tissue anoxia. The decreased kidney elimination is shown by the azotemia itself, by diminished water and salt elimination, and by a fall in urea, inulin, and diiodine clearance. Hence the available evidence suggests that the usual moderate increase in blood urea with gastro-duodenal bleeding is accounted for mainly by the absorption of nitrogen in large amounts from the blood in the bowel at a time when the kidneys are hampered by a diminished volume-flow of blood. If the hemorrhage is very severe, breakdown of tissue protein becomes important as a source of nitrogen, and kidney function is further impaired, so that azotemia is more pronounced.

N. S. SKINNER

Surgery

Gunshot Wounds of the Chest. Hardt, H. A., Jr. and Seed, L.: *Arch. Surg.*, 1942, 44: 779.

This is one of a symposium of articles on gunshot wounds, burns and shock. The authors review a series of 280 cases from the record of the Cook County Hospital during the nine-year period 1931 to 1939.

There were 130 patients with superficial gunshot wounds of the chest in whom there was no evidence that the pleural cavity had been entered by the projectile. Among these, the period of hospitalization was short and serious complications were few, apart from wound infection or abscess of the chest wall, which extended into the pleural cavity causing empyema which required resection of a rib and drainage. In this series, one patient developed tetanus and died.

Penetrating gunshot wounds of the chest occurred in 150 patients. The majority were in shock when admitted. This was severe in 45 and moderate in 36 patients. In a few, no shock was present. Dyspnea in varying degrees and pain in the chest were common complaints. Hemoptysis occurred in 73, but in many of these instances it was small in amount and did not recur. Subcutaneous emphysema was present in 61. Hemothorax and hemopneumothorax occurred in 55 and 61 respectively. Pneumothorax was seen in only three of the patients

with penetrating wounds. Damage of the spinal cord was the only severe extra pulmonary complication in this series. Five of these patients died.

Twenty-six patients with penetrating wounds died, a mortality rate of 17.3%. The early death of patients with penetrating wounds is almost exclusively due to hemorrhage. The common causes of late death are lesions of the thoracic portion of the spinal cord and sepsis.

G. E. LEARMONTH

Modern Management of Cancer of the Lower Gastro-intestinal Tract. "Traitement actuel du Cancer de l'extrémité inférieure du Tractus gastro-intestinal." Rankin, F. W.: *Surg., Gyn. & Obst.*, 1942, 74: 905.

Le traitement chirurgical du cancer de l'extrémité inférieure du tractus gastro-intestinal a réalisé des progrès exceptionnels dans les trois dernières décades. L'auteur est partisan des procédés de Miles et de Mummery, sans écarter pour cela des procédés moins radicaux qui peuvent présenter occasionnellement des avantages réels.

Quoique le cancer du colon, surtout celui du colon gauche, se complique presque toujours d'obstruction intestinale—aiguë, sub-aiguë, ou chronique—il est préférable de réaliser au préalable l'évacuation par une thérapeutique médicale. Si celle-ci est insuffisante: pratiquer une œcécotomie.

La technique opératoire et la question du choix de l'opération doivent varier suivant qu'il s'agit du colon droit ou du colon gauche, à cause de leurs différences physiologiques, pathologiques et anatomiques. En général, le cancer du colon droit peut être résecté avec sécurité par une ileo-colostomie pratiquée en un ou deux temps. L'auteur est contre l'extériorisation du colon droit, à cause du danger d'infection, des ennuis inhérents à l'anus artificiel et parce que le patient peut aussi bien tolérer une anastomose immédiate. Le taux de mortalité cité indique que l'opération en deux temps est la moins dangereuse, lorsqu'il s'agit d'un cancer du colon droit.

Dans le cas du colon gauche, l'auteur recommande la résection avec anus iliaque. Il se défend de standardiser les procédés opératoires, ainsi que les mesures pré- et post-opératoires. Le taux des guérisons et de la mortalité est révélateur de la souplesse avec laquelle chaque chirurgien adapte les différentes techniques indiquées suivant les cas.

PIERRE SMITH

External Biliary Fistulas. "Fistules biliaires externes." Hicken, F., White, L. B. and Coray, Q. B.: *Surg., Gyn. & Obst.*, 1942, 74: 828.

La fistule biliaire externe est une complication qui se produit occasionnellement à la suite d'une cholécystostomie ou d'une cholécystec-

tomie. Le fait de n'avoir pas enlevé tous les calculs biliaires lors de la première opération contribue dans la proportion de 88% à la formation des fistules. L'auteur s'appuyant sur 33 cas étudie les fistules biliaires externes au point de vue de l'étiologie, de la prévention, du diagnostic et du traitement.

Il est partisan de l'emploi étendu de cholangiogrammes avant et après l'opération afin de guider le chirurgien dans son traitement. Quand la fistule correspond avec la vésicule, celle-ci ne doit pas être dérangée tant que le status fonctionnel du conduit biliaire n'a pas été établi. Quand le cystique est obstrué il est nécessaire d'explorer le cholédoque au moyen de cholangiogrammes, en cours d'opération, en utilisant le diodrast. Si ce dernier s'écoule normalement, d'autres explorations ne sont pas nécessaires. Une simple cholécystectomie avec excision de la fistule suffira.

Suivent des conseils sur les précautions à prendre lors de l'extraction des calculs, et les modes de drainage. Les tubes de drainage doivent demeurer perméables afin de décongestionner le foie engorgé. Lorsqu'il se mêle à la bile des sécrétions chargées de débris de muqueuse et de caillots sanguins, on évitera l'obstruction du tube en introduisant de l'essence de carvi qui liquéfie les caillots et dissout les débris muqueux. On peut obtenir un relâchement du sphincter d'Oddi, si cela est nécessaire, en se servant de nitroglycérine et de sulfate d'atropine.

Enfin le cholangiographie guidera utilement sur la durée du drainage en renseignant sur la perméabilité du conduit biliaire et de son fonctionnement après l'opération. Tant que les réactions inflammatoires subsisteront le drainage devra être continué.

PIERRE SMITH

Obstetrics and Gynecology

Immediate Post-partum Repair of Old Perineal Lacerations. Waters, E. G., Cartwright, E. W. and Lynch, J. E.: *Am. J. Obst. & Gyn.*, 1942, 44: 124.

Immediate post-partum repair of old perineal lacerations is a safe and feasible gynecoplastic procedure. Reparative operation is especially recommended for a symptom-producing condition in a patient fearing or unable to afford rehospitalization at a more propitious time. Although later operation is cleaner and less bloody, and allows a better technique, there is little added risk from immediate operation, and the morbidity incidence is low. Perineal infection was noted in 5 of 148 reparative operations, and the repair broke down completely in three of these. The outstanding postoperative complication is dyspareunia and this is avoidable.

Immediate post-partum repair of cystocele is much less satisfactory and offers reasonable probability of effective correction only in selected cases and in expert hands. It is not

without danger and most satisfactory results are generally obtained by later operation.

ROSS MITCHELL

Macrocytic Hyperchromic Anæmia of Pregnancy. Daniel, M. and Antis, M.: *Am. J. Obst. & Gyn.*, 1942, 44: 93.

A case of a severe grade of macrocytic hyperchromic anæmia induced by pregnancy is presented. It was recognized and successfully treated with blood transfusion and parenteral liver therapy. A living male child was delivered spontaneously. A blood count of the child revealed no abnormalities.

ROSS MITCHELL

Intratesticular Hæmorrhage: A Birth Trauma.

Halpert, B.: *Am. J. Obst. & Gyn.*, 1942, 43: 1028.

Reports of eight cases are given. Seven cases were encountered by the author in slightly over a year among 21 male infants who died when less than one week old. Attention is called to the frequent occurrence of intratesticular hæmorrhage as an injury sustained during birth in cases where the head is the presenting part.

ROSS MITCHELL

A Clinical and Pathological Study of the Permanently Enlarged Uterus. Goodall, J. R., Altimas, G. T. and Ayre, J. E.: *J. Obst. & Gyn. Brit. Emp.*, 1942, 49: 18.

Chronic subinvolution, as the term implies, is an incomplete involution of the puerperal or post-abortual uterus. It is known under various names, such as chronic metritis, fibrosis uteri, and arteriosclerotic uterus. The commonest cause is a chronic low-grade infection, causing a lymphatic block, parallel, in many ways, to venous thrombosis.

Chronic subinvolution is the expression of a faulty and incomplete breaking down after pregnancy at term, or an abortion. The symmetrical uterine enlargement (group A) and the asymmetrical enlargement of the uterus which accompanies fibroids and endometriosis (group B), are responses to a stimulus, and most probably to the growth-hormone œstrin, which also is responsible for the fibroids and the endometriotic ectopias. In other words, the uterine enlargements, the endometriosis, the fibroids and the myomata, are different expressions of a common cause.

This stimulus makes itself felt in changes in all the pelvic organs. These generalized changes may be imperceptible in the milder cases, except as a local manifestation, but are easily recognizable in the more severe and prolonged endocrine dyscrasias. They may involve the pelvic peritoneum as a diffuse cartilaginous sclerosis. They stimulate the quiescent paro-

varium into secretory and cellular activity, the Fallopian tubes into invasive growth, the endometrium into a thickened endometrium characteristic of persistent follicular over-activity, or the endometrium may grow ectopically, either in the uterine wall or in any of the pelvic tissues below the umbilicus. P. J. KEARNS

A Case of Arrhenoblastoma. McIntyre, W. K.: *J. Obst. & Gyn. Brit. Emp.*, 1942, 49: 41.

The presence of a palpable abdominal tumour, which had first been noticed by the patient soon after amenorrhœa began, and which steadily increased in size, together with the obvious masculinizing syndrome, made the differential diagnosis comparatively simple in this case.

The morphology of the tumour is in appearance similar to the group termed arrhenoblastoma; and would, in Meyer's classification, conform with his third or atypical group. The pronounced masculine changes which Meyer associated with this group were present.

It is a matter of conjecture whether the rapid reappearance of the menses while she was still in hospital was due to the administration of antuitrin S. Grant Baldwin and James Gafford in the report of their case suggest that the male hormones secreted by the tumour render the anterior pituitrin hormones inactive, either directly or indirectly. In this case the uninvolved ovary looked so shrivelled and inactive that one would not have expected any immediate hormonal activity on its part. Possibly the extra stimulus from the injected hormone hastened its recovery.

The case which is described is believed to be the first reported in Australia of an arrhenoblastoma of the ovary, in which typical histological findings were associated with the clinical findings of masculinizing and feminizing changes. Since the surgical removal of this tumour the patient has menstruated normally and is showing a gradual return to feminism. P. J. KEARNS

Pædiatrics

A Comparison of Gentian Violet and Hexylresorcinol in the Treatment of Pinworm Infestation. Evans, H. L. and Moore, H. J. *Pædiat.*, 1942, 20: 627

Of the many different forms of treatment for pinworms, gentian violet with an enteric coating and hexylresorcinol have apparently shown most promise. In order to compare the effectiveness of these two drugs, approximately 100 children in an orphans' home were studied. 78% were found to be infected. The value of the NIH cellophane swab method of diagnosis was clearly evident. Patients seemed to tolerate gentian violet better than they did hexylresorcinol. Percentage of cures after giving gentian violet was 77%; after hexylresorcinol it

was 50%. Reinfestation occurs with ease, and periodic repetition of the treatment may be necessary. Smaller doses of the drug were given over longer periods of time with considerably less reactions than previously reported. In the case of gentian violet dosage used was 1 mgm. per pound of body weight per day, this dosage being divided into three equal doses and given 30 minutes before each of the three meals. The drug was given every-day for a week, then a rest period of one week, followed by a second period of treatment, then another rest period of one week, and finally a third week of treatment.

S. J. USHER

Oto-Rhino-Laryngology

The Otogenic Cerebellar Abscess, with Special Reference to the Posterior Fossa Cerebrospinal Fluid Syndrome. Asherson, N.: *J. Laryngol. & Otol.*, 1942, 57: 129.

The author reviews his five cases with those of others, pointing out the diagnostic value of lumbar puncture with pressure reading and examination of the cerebrospinal fluid. He believes that if lumbar puncture is performed on the threshold of the operating theatre and only a small amount of spinal fluid is withdrawn the procedure is quite safe. Corking of the foramen magnum by the medulla with respiratory paralysis can be relieved instantly by operation if it should occur. He has never seen this condition. The characteristics of the spinal fluid are diagnostic. Normal, or only slightly raised, cerebrospinal fluid pressure, slight pleocytosis, 10 to 100 per cubic millimetre, 90% lymphocytes, chloride content within normal limits; sterile culture, and sugar-reducing bodies present. The above with a suppurating ear and marked nuchal rigidity is diagnostic of an encapsulated cerebellar abscess according to the author's experience.

GUY H. FISK

Radiology and Physiotherapy

Muscle Spasm in the Acute Stage of Infantile Paralysis. Schwartz, R. P. and Bouman, H. D.: *J. Am. M. Ass.*, 1942, 119: 923.

The authors, using an amplifier oscillograph, recorded action currents in poliomyelitic patients. Affected muscles, antagonists of affected muscles, and apparently normal muscles in poliomyelitic patients were tested. These were compared with suitable controls. The results showed that in infantile paralysis spasticity of the muscles exists not only in the antagonist of the weakened muscle, as claimed by Sister Kenny, but also in the weakened muscle itself, and in muscles in parts of the body in which clinical symptoms of the disease are not evident. The spasticity is of a reflex nature and is not present in the completely paralyzed muscle.

When the strength of the voluntary contraction increases through treatment the spasticity decreases. The experiments did not show whether spasticity was actually responsible for the weakening of the muscle or whether it was merely another consequence of the disease independent of the muscular weakness.

GUY H. FISK

Recent Changes in the Concept of the Treatment of Poliomyelitis. Steindler, A. et al.: *Arch. Phys. Therapy*, 1942, 23: 325.

The authors believe that fixation should not be entirely abandoned. A restricted period of fixation should be used when the condition is acute. Also as relaxation of the ligaments and joint structure accompanies infantile paralysis some type of support is essential when the static functions are resumed. Unstable joints must have supports provided. When stable, the supports may be discarded. Selective training of the affected muscles is essential, the action of the muscle being first demonstrated passively. This training is to be commenced as soon as the acute stage is over. Spasm is treated with hot applications from the beginning.

GUY H. FISK

Therapeutics

Pneumonia: A Study of One Hundred and Thirty-two Cases Treated in the Home with Sulfathiazole. Roxenthal, J., MacColl, W. A. and Pratt, J. H.: *New Eng. J. Med.*, 1942, 226: 845.

During the winter of 1940-41, the Domiciliary Medical Service of the Boston Dispensary treated 132 cases of pneumonia in the patient's homes. These cases were seen by one of four men who constituted the Pneumonia Service and one of whom was called in whenever pneumonia was suspected by one of the district physicians. A complete blood count, urinalysis, blood culture and sputum examination was done on each patient. Following this, treatment was started with sulfathiazole, the initial dose in adults being 4 gm. (60 gr.) followed by 1 gm. every four hours day and night, until the temperature had been normal for seventy-two hours. In children, the initial dose was one grain per pound body weight followed by a daily dose of the same size, divided into six four hourly doses, the drug being discontinued after the temperature was normal for thirty-six hours. Fluids were forced and the patients were carefully followed, being referred to hospital for x-ray if residual signs persisted in the chest during convalescence. Blood levels of sulfathiazole were not determined.

The ages of the patients ranged from two months to eighty-six years. Approximately half the patients were below the age of twelve, and 17% were above the age of fifty. Three patients

were over the age of eighty. In the majority of cases treatment was instituted within forty-eight hours of onset. Pneumococci were found in the sputum in 53% of cases and 6 cases had a positive blood culture. The average length of time before the temperature became normal was forty-eight hours and the average duration of treatment was four days. Of the 132 cases five died. Three of these were over seventy-five years of age. A fourth was a chronic alcoholic who had previously been treated for cirrhosis of the liver, and the fifth, aged forty-one years, was also a chronic alcoholic.

The authors add a footnote to the effect that during the winter of 1941-42, eighty-five additional cases of pneumonia were treated under the same conditions, except that sulfadiazine was used. One death occurred in a seventy-five year old woman, who at autopsy showed carcinoma of the bowel with obstruction and widespread metastases.

N. S. SKINNER

Hygiene and Public Health

Tuberculosis Case-finding in Institutional Populations. Hilléboe, H. E., Haas, R. B., Palmer, C. E. and Gardner, W. P.: *Am. J. Pub. Health*, 1942, 32: 516.

The authors report a study to test the efficiency of the 35 mm. fluorogram for routine mass examinations of the chest. They submitted 1,264 patients in mental hospitals in Minnesota to x-ray examinations by the standard 14 x 17 film and by 35 mm. fluorogram.

Taking the 14 x 17 film as the standard of diagnosis, 246 cases of tuberculosis were detected (19.5% of the population). Of these 264 cases, 158 were minimal; 74 moderately advanced; and 14 far advanced. The 35 mm. films were classed as abnormal, suspicious, or negative. Of the 14 far advanced cases all were classed as abnormal by the 35 mm. film. Of the 74 moderately advanced cases 71 were classed as abnormal or suspicious, and 3 were considered negative. Of the 158 minimal cases 140 were classed as abnormal or suspicious, and 18 considered negative by the 35 mm. film. There were 31 films "overread" by the 35 mm. technique. That is to say they were classified as abnormal or suspicious, when by 14 x 17 film they were negative. None of the cases missed by the 35 mm. film were clinically active.

There is evidently an error in using the 35 mm. fluorogram which is greater than that of

the 14 x 17 plate. This error might lessen as individuals became more familiar with interpretation of the small film. The big advantage of the 35 mm. film is, of course, its cheapness. The film itself costs about 1/50th of the 14 x 17 film, and processing is also cheaper. An additional advantage is the ease of storage. The argument of those who advocate the use of the small film for mass examinations is that, despite its slight error, many more people may be examined for the same cost and therefore many more cases of tuberculosis discovered.

FRANK G. PEDLEY

Use of Alum-Treated Pertussis Vaccine, and of Alum-Precipitated Combined Pertussis Vaccine and Diphtheria Toxoid, for Immunization. Kendrick, P. L.: *Am. J. Pub. Health*, 1942, 32: 615.

In an earlier article Kendrick had reported considerable protection conferred on children following the inoculation with 70 billion H. pertussis organisms over a 5 week period. This report deals with further inoculations with alum-precipitated vaccine and standard vaccine and with a combined alum-precipitated pertussis vaccine and diphtheria toxoid.

In the first series, 2,751 children were studied, all in the age-group 6 months to 3 years; 655 children were treated with alum-precipitated vaccine, 993 with standard pertussis vaccine and 1,103 were used as controls. The attack rates subsequent to vaccination per 100 person-years were: 1.6 for alum-precipitated vaccine, 1.8 for standard vaccine and 9.0 for the control group. Slightly more severe reactions were recorded from the alum-precipitated vaccine. As in the previous study the whooping cough which did occur among the vaccinated group was generally milder than among the controls.

In the second series 2,194 children were studied: 847 were inoculated with alum-precipitated combined diphtheria toxoid and pertussis vaccine, 380 with standard pertussis vaccine and 967 were used as controls. The attack rate from pertussis per 100 person-years was 0.7 for the combined vaccine, 1.6 for the standard vaccine and 10.9 for the controls. Thirty-four children given the combined vaccine were tested for antigenic response to diphtheria toxin by serum titration. Before the inoculation all the 34 children showed a serum titre of less than 0.001 units of antitoxin. Five to twenty months after inoculation 98.6% had a level of 0.01 units or more than 82.4% of 0.1 units or more.

FRANK G. PEDLEY



Obituaries

William Herbert Lowry, M.D., C.M., M.R.C.S., F.R.C.S.(C), of Toronto, died on July 13, 1942. He was the son of William Hugh and Ann Jane Hill Lowry, was born in Acton, Ont., on September 26, 1880. He chose to follow his father's footsteps in medicine, and graduated in 1901 with the degree of M.D., C.M., at Trinity University, Toronto, where his father had been gold medalist, though he had come as a boy from County Cork in Ireland. Ann Jane Hill Lowry was born in Peru, Ont. From Acton the Lowry family moved to Guelph in order that the children might have the educational advantages of a larger city.

Dr. William Lowry early decided to practise ophthalmology, and after his university course at Toronto, took his special training at London and Birmingham. On his return to Toronto in 1906 he was appointed to the staff of the Hospital for Sick Children, and in 1919 he became surgeon-in-chief of the Ophthalmic Department. In 1929 he was appointed Professor of Ophthalmology and head of the department at the University of Toronto, succeeding Professor James MacCallum. Owing to ill health he resigned in 1941 and became Professor Emeritus of Ophthalmology, when Professor Walter Wright succeeded him.

The first World War interrupted his practice and he served with No. 4 General Hospital in England and Salonika, in charge of ophthalmology, and his valuable work received recognition in his rank as Major and later as Lieutenant-Colonel. After the war he resumed his work in Toronto and rapidly established an extensive practice. His opinion was much sought after and in consultation he was helpful to patient and physician alike, and his quiet manner inspired confidence. It was characteristic of him that he interrupted his summer holiday to answer an urgent call, and it was at the home of his patient that he suffered the heart attack which resulted in his death on July 13, 1942.

In 1926 he married Lorna Corrine MacKendrick, who survives him with two daughters, Ann Corrine and Lorna Beverly, and two sons, William Gordon and Alan MacKendrick. Two sisters, Mrs. Frank MacArthur, of Toronto, and Mrs. Thomas Fannin, of Vancouver, and a brother, Edwin Lowry, of Winnipeg, form the rest of his immediate family. He was a devoted husband and father and when the stress of work permitted it, an afternoon excursion into the country with his children appealed to him. He wanted to instil in them the love he had for our woods, streams and sunshine.

As a sportsman he enjoyed the games of golf and tennis, both of which he played well, and he loved the forests and lakes of the northland. In hunting it was the outdoor life that he liked and he admitted to having more interest in the ballistics of fire-arms, than in their more usual purpose. He was an excellent shot and his hobby was the collection of a wide variety of beautiful and accurate hunting equipment of which he was a discriminating judge. More than a hobby for him was his summer home, situated on the river near Baysville, Lake-of-Bays. The house and grounds gave evidence of his care and planning and the first sunny week-end in the early spring would find him there to see how it had come through the winter.

His professional activity was the despair of house-surgeons who missed many breakfasts to be on hand for his early round which was made before eight o'clock, even in winter with daylight-saving time. In the operating room he was deft and sure, with a conservative but hopeful outlook which meant much to his patients who held him in high esteem. At his office he always had time for a little joke and his patients came to feel they were his personal friends. His clinical notes were meagre but his memory for details amazed his staff on many occasions. He made an effort to become familiar with

the habits and home environment of those he treated and when pressed with work he regretted that he could not give more time to each patient. He was an earnest and painstaking teacher and was particularly interested in undergraduate training; even after his retirement he presented prizes to stimulate the interest of students in ophthalmology.

His personal habits were spartan and his character was a model of sincerity, kindness and integrity, and his many friends and colleagues in all branches of the profession will deeply regret the loss of one who was always helpful, unassuming and companionable and who overlooked the shortcomings of others in a most charitable way. His occasional quiet criticism was offset by his staunch support for the loyal service of all who worked with him in his special field and in the wider realm of medicine.

ALEXANDER E. MACDONALD

Dr. Thomas Hugh Balfe, of Toronto, died suddenly on August 16, 1942.

Dr. Balfe resided in Toronto, and had been associated with Dr. M. H. Limbert, plant physician, C.I.L., at Nobel, for a considerable time.

Born in Hamilton, 42 years ago, the son of the late Dr. T. H. Balfe, Dr. Balfe graduated from the University of Toronto Medical School in 1923 and for a time practised in Hamilton.

Dr. Herbert Huestis Best died at the summer home of his daughter, Mrs. Ralph Salter, at Shadow Lake, near Cobecook recently. For forty-six years he conducted a general medical practice at West Pembroke, Maine, U.S.A., near the New Brunswick border.

He was born in King's County in the Annapolis Valley, N.S., seventy-one years ago, a lineal descendant of Major William Best, one of the founders of Halifax, N.S. He was a graduate of the medical school of Dalhousie University and of New York University (1896). He was a frequent visitor to Toronto, where he had sent his son and daughter to university. His son, Dr. Charles Best, was working with Sir Frederick Banting at the time of the discovery of insulin.

Dr. Elmer Wellington Brown, of Neustadt, Ont., died suddenly on August 20, 1942, at his home following a heart attack. He was 57 years of age and was born in 1885 in Neustadt, a son of the late Dr. William M. Brown. Dr. Brown was a graduate of the University of Western Ontario (1911), and practised medicine in Red Cliff, Alta., and in Hanover, as well as in Neustadt.

Dr. Robert Abraham Maitland Cook, of Calgary, died on August 28, 1942, at the age of 62. Born near Markdale, Ont., after finishing his preliminary and secondary education, he attended Trinity University, Toronto, where he graduated in medicine in 1903. In 1904, he came west and settled at Maidstone, Saskatchewan, later moving into Weyburn, where he became associated with the late Dr. Hugh Eaglesham. In 1914, he moved to Calgary and shortly after went overseas with the 89th battalion. After being invalided home, he was A.D.M.S. at the Sarsco Military Camp.

He commenced private practice in Calgary and enjoyed the confidence of many patients for over 20 years. He was ill for eight months when he finally passed away.

Dr. John Ferguson, of Mount Forest, Ont., died suddenly on September 15, 1942, aged 66. He came to Mount Forest a year ago from Kincardine, where he had practised continuously for 38 years.

Dr. Ferguson retired two years ago. A year ago the need for medical doctors so impressed him that he came to Mount Forest to establish a practice. He

was for many years Medical Health Officer in Kincardine. He was born in Harriston, where he received his early education, and graduated in medicine from the University of Toronto (M.B. 1903).

Dr. Eugène Gagnon, demographer and statistician to the Montreal Health Department, and reputed one of the leading authorities on that subject in Canada, died recently at the Hotel Dieu, aged 65, following a lengthy illness. He was a graduate of Laval University (Montreal Branch, 1902).

Dr. Gagnon joined the city's service in 1914 and in 1916 was placed in charge of child hygiene. In 1928 he became superintendent of the statistical division and, ten years later, became associate director and head of the demographic service. Some years ago he was elected president of the statistical section of the Canadian Public Health Association.

Dr. William Thomas Gemmell, of Stratford, Ont., died in Stratford General Hospital on September 9, 1942, in his sixty-eighth year. He was a graduate of Trinity University (1903).

Dr. Francis James Hackett, one of the oldest practising physicians in Montreal, died on September 6, 1942, in his 80th year.

A native of Milton, Que., he came to Montreal as a young man, and took his medical course at Bishop's Medical School which was later amalgamated with McGill University. He later taught anatomy at Bishop's and was a staff member at St. Jean de Dieu Hospital for several years.

He was closely associated with the foundation of the Western Hospital, now a division of the Montreal General, and was the secretary of the medical board. In addition, he was a consultant at St. Mary's Hospital. He was also honorary president of the Catholic Sailor's Club. He was unmarried.

Dr. Paul Zotique Hebert. We have only recently learned of the death, on December 3, 1941, of Dr. Paul Zotique Hebert, in Los Angeles at the age of 92. He was born in St. Constant, Que., on May 25, 1849.

Dr. Hebert was the last survivor of the 28 who graduated with Osler in medicine. His work was largely in gynaecology, but he contributed numerous papers on various subjects to the journals. Amongst these was one on the efficacy of salvarsan in the treatment of syphilis. He was one of the first in America to employ this treatment.

He was a Foundation Fellow of the British Gynaecological Society, and was a member of several Societies and Associations. Much of his life was spent abroad, practising in London and later in New York, before retiring some years ago to California. He always retained his Canadian associations and was a life-long member of Society of St. Jean Baptiste of New York.

Dr. David Jamieson, of Durham, Ont., former M.P.P. for South Grey, and chairman of the Mothers' Allowance Board and later of the Old Age Pensions Board, died at Durham, Ont., on September 12, 1942, at the age of 86. He was one of the best known residents of Durham and for many years was a prominent figure in the political life of the Province. He represented his constituency for twenty-four years in the Ontario Legislature, four of them as Speaker.

Born at Puslinch, near Guelph, in February, 1856, Dr. Jamieson was the son of William and Ann Jamieson, who came from Aberdeen, Scotland. When he was five years old the family removed to Mount Forest,

where he attended school until 13 years of age. Then he spent five years in the printing office of the Mount Forest Examiner and won the championship as the fastest typesetter in Canada. He was a graduate of Toronto (1878).

Dr. Oswald E. Kennedy, of Landis, Sask., a former well known resident of Ottawa, died suddenly on August 3rd in Landis, Sask., as the result of a fall at his office. He had been the municipal doctor at Landis for the past year.

Dr. J. J. Knoll. On July 31, 1942, Alberta lost one of its outstanding rural practitioners in the person of Dr. J. J. Knoll, of Vermilion, at the age of 62. He was born at Dunkeld, Ont., and after matriculation he engaged in teaching in Ontario and later in Alberta in order to finance his medical education. He attended McGill University and graduated in 1915, and went immediately to Vermilion as assistant to Dr. F. D. Smith. He later opened an office in Provost, but finally in 1924 he returned to Vermilion and took over the practice of Dr. Smith, who went to Winnipeg. He enjoyed a very extensive practice, but still took time to enter into the community life of the district. He was for ten years a member of the public school board and was chairman of it at the time of his death. He was highly esteemed.

Dr. Joseph E. Prud'homme, of Montreal, died on September 2, 1942, in his 50th year.

Dr. Prud'homme was a graduate of Laval University (Montreal Division, 1919). On his return from Europe he was appointed to the surgical staff of the Hotel Dieu. He had been chairman of the hospital medical board since last March. He was also attached to the medical faculty of the University of Montreal.

Captain Charles Taylor Robertson. Word has been received by Mrs. George Robertson of 9 Hurndale Avenue, Toronto, that her son, Captain Robertson, 11th Field Ambulance, had been killed in the raid at Dieppe. He was 30 years of age.

A graduate in medicine of the University of Toronto (1939) Captain Robertson was a wrestling champion and active in boxing and soccer while a student at Varsity.

Captain Robertson was born in Whitby, where he received his early education. Later he attended Jarvis Collegiate, Toronto. Following his graduation from the University of Toronto in 1939, he joined the staff of the Toronto East General Hospital, leaving in April, 1940, to become associated with the Royal Canadian Army Medical Corps. He went to England two years ago with the rank of lieutenant and later was promoted to captain. He had recently been placed in charge of "A" Company, 11th Field Ambulance.

Dr. John Peter Sinclair, of Gananoque, Ont., died on September 12, 1942, aged 73. He was a graduate of the University of Toronto (1894).

Dr. W. D. Smith died suddenly while addressing the convention of Workmen's Compensation Boards on September 16th at Saint John, N.B. Dr. W. D. Smith, who was 62 years old, had been a commissioner of the Ontario Workmen's Compensation Board since December, 1939. He was keenly interested in the rehabilitation aspect of the organization. Elected Liberal member of the Ontario Legislature for Dufferin-Simcoe Riding in 1934, he represented that constituency until 1937.

Dr. Smith was born at Curries, Oxford County, Ont. He received his early education at Woodstock Collegiate Institute and Ottawa Normal School. For a

number of years he taught school and served as public school principal in Woodstock. Graduating in medicine from the University of Toronto in 1911, he established a practice in Creemore, where he remained for twenty-seven years. With the opening of the Ontario Hospital in St. Thomas, he was appointed superintendent, remaining in that position until the institution was taken over by the Royal Canadian Air Force in 1939.

News Items

Alberta

The College of Physicians and Surgeons of Alberta are co-operating with the Federal authorities in the matter of supplying medical men for the forces, and has made an analysis of the members of the profession and grouped them according to ages with the following result: Age group 20 to 29, 43; 30 to 39, 176; 40 to 49, 121; 50 to 59, 57; 56 and over, 240, of this number 124 are in the forces. In addition to this there are 27 others, unregistered men, making a total of 151. Of those under 56 years of age, a third have enlisted, and of 423 in private practice only 195 are under 50 years of age.

Recently four district meetings were held in Medicine Hat, Lethbridge, Drumheller and Red Deer. A larger number of physicians than usual were present at the meetings. Dr. G. R. Johnson, Registrar, discussed the working of the Council of the College of Physicians and Surgeons of Alberta, and the following gave addresses: Dr. H. V. Morgan, on surgical shock; Dr. H. N. Jennings, on medical aspects of cardioronal and gastrointestinal disorders.

Squadron Leader G. McKay, of the University of Edinburgh, spoke on aviation medicine and the early treatment of wounds.

The annual refresher course at the University Hospital, Edmonton, under the auspices of the Alberta Division, Canadian Medical Association, and the University of Alberta, was held the week of September 7, 1942. There was a special demonstration of the Nurse Kenny treatment of poliomyelitis. Among the outside physicians assisting at the refresher course were Dr. G. F. Strong, of Vancouver, and Dr. Roseoe R. Graham, of Toronto. The course was attended by a large number of Alberta men.

The Department of Health at Edmonton has decided to make a thorough test of the Kenny treatment of poliomyelitis and with that end in view have sent the medical profession full information in pamphlet form.

The Alberta Cancer Diagnostic Clinics are now undertaking to have cancer surgery performed where such is indicated and have agreed that all capable surgeons should have an opportunity to do it when chosen by the patient. Therefore, the College of Physicians and Surgeons have sent out a questionnaire to all the men, asking those who are willing to do surgery to specify the type they are prepared to do. Only in hospitals with a trained pathologist will this cancer surgery be performed. G. E. LEARMONTH

Manitoba

That most active district medical society, the Northwestern, held a meeting at the Sacred Heart Hospital, Russell, on August 19th, which attracted medical men and their wives from Neepawa, Virden, Hamiota, Birtle, Shoal Lake, Miniota, Langengberg, Roblin, Russell, Minnedosa, Rossburn, Angusville, Spyhill and Binsearth. Dr. John Skafel, of Minnedosa, presided, and Dr. E. D. Hudson, a senior member of the Canadian Medical Association, was secretary. The guest speakers were Drs. Neil John Maclean, W. A. Gardner, and J. C. Hossack, of Winnipeg. Wives of the out-of-town doctors were guests at the home of Mrs. T. I. Brownlee. The visiting doctors were entertained at dinner in the Queen's Hotel.

Dr. J. Roy Martin, of Neopawa, and Dr. A. F. Menzies, of Morden, have been appointed by the Manitoba Government to the provincial board of health. They will fill the vacancies created by the deaths of Drs. G. W. Rogers, Dauphin, and J. S. Matheson, of Brandon.

Dr. Irwin H. Mazzerovsky has been appointed provincial coroner at Churchill. ROSS MITCHELL

Nova Scotia

Poliomyelitis Clinic at Halifax.—A clinic for the treatment and study of anterior poliomyelitis has been formed at Halifax. It comes at a time when, with more cases than ever reported before in Nova Scotia, the treatment is particularly needed, and the opportunities for study are great. The clinic is a product of the Provincial Health Department, working in co-operation with the City Health Board and its hospital for infectious diseases. Its staff is made up of a clinical and scientific group from Dalhousie University, supported and aided by nurses of the Province, the city and the services. The method of treatment is that originated by Nurse Kenny.

When Dr. F. R. Davis, Nova Scotia's Health Minister, enlisted Dr. Cecil Kinley to attend Nurse Kenny's clinic at the University of Minnesota, to pass his clinical judgment on her work and on the teachings two government nurses had already received, he had a man most unresponsive to surgical faddism. Dr. Kinley went to Minnesota a skeptic; he returned a disciple. Expecting to make his report and get back to his general surgical affairs, he found himself overwhelmed with a poliomyelitis clinic that almost formed itself.

The materials needed for the Kenny treatment are simple: hard beds, with footboards, and old blankets to be cut for compresses. But the efforts it demands of its surgical staff are long and sustained. The clinic at the Halifax hospital has had some 40 cases under treatment. Some of these were admitted in the earliest stages; most were far advanced, a few, convalescent. Early results are striking and give promise of bearing out the good results of the Kenny methods found in a few American, and in Australian clinics. It is the hope of the Halifax clinic that they may be able to present a group of cases in which paralysis is a rarity, and deformity non-existent.

In addition to his clinics in Halifax Dr. Kinley with Dr. Davis has conducted clinics throughout the centres of the Province. Associated with him, for the purpose of studying not only anterior poliomyelitis but the potential, new field of muscle physiology opened by Nurse Kenny's work, are a group from the medical, surgical, pathological, anatomical and physiological departments of Dalhousie. A. L. MURPHY



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Ontario

Dr. J. W. Crane, Director of the Alumni of the University of Western Ontario Medical School, was tendered a complimentary banquet at the Granite Club in Toronto by Dr. Charles Brereton on behalf of Western graduates. As an expression of appreciation of the work done by Dr. Crane in the organization of the Association and its branches, he was presented with an inscribed billfold. Representatives were present from various organizations he had brought into being—Essex County, Hamilton, Oshawa, etc.

The Government of the Province of Ontario takes great pride in the satisfactory results which their attempts to lower the death rate from tuberculosis are showing. Dr. G. J. Wherrett, Secretary of the Canadian Tuberculosis Association, in his announcement regarding the tuberculosis death rates in Canada in 1941, revealed that the Ontario rate of 29.2 per 100,000 is the lowest in Canada.

The Medical Officer of Health of the City of Toronto has laid before the Board of Health of the City a proposition whereby free medical service will be provided the families of soldiers who are without sufficient funds. The attention of his Department has been drawn to the acute condition existing in some soldiers' families where several children and the mother may require attention. In future the Health Department doctors will give the needed attention.

The W. K. Kellogg Foundation of Battle Creek, Michigan, has made a grant of \$10,000 to the three medical schools in Ontario (and we believe the medical schools throughout Canada have received similar grants), for the purpose of assisting students who would have difficulty in financing their course under the newly accelerated schedule. The gift will be extended to medical students in the form of loans at a low rate of interest. This will supplement that provided by the Dominion Department of Labour for like purpose. It will be available for those not eligible for government loans.

The Librarian of Queen's University announces the gift of a number of old medical books from graduates overseas. These have been forwarded to the Library with the suggestion that they form the nucleus of a special library of medical history which might serve as a fitting memorial to the late Dr. Thomas Gibson who, in addition to his work as Professor of Therapeutics and Pharmacy, for many years gave the special lectures on history of medicine. The librarian expresses a hope that other alumni and friends will help toward the building of a comprehensive collection of texts of historical interest as a tribute to a fine teacher and scholar.

Further Ontario women physicians are becoming attached to the Canadian active army. Dr. Viola Rae, Bacteriologist at the Mountain Sanatorium, Hamilton, becomes bacteriologist at the Central Laboratory at Camp Borden; Dr. Shirley Fleming on the Staff of the Women's College Hospital, Toronto, will be Anæsthetist at the Camp Borden Military Hospital.

J. H. ELLIOTT

Quebec

The fifth annual Louis Gross Memorial Lecture will be delivered by Professor Boris P. Babkin on October 21, 1942, at 8.30 p.m. at the Jewish General Hospital, Montreal, under the auspices of the Montreal Clinical Society. The subject of this lecture is "Restoration

of the functional capacity of stomach deprived of its main arterial blood supply". Professor Babkin is Research Professor of Physiology at McGill University.

Professor Jonathan C. Meakins, dean of medicine at McGill University in Montreal, has been appointed deputy director-general in charge of all professional activities, with rank of brigadier.

Dr. Menkins has had considerable experience in war time medical services. He served overseas in the Great War with the McGill Hospital Unit, C.A.M.C. as major. After a short time in France he was transferred to England and was in the Military Heart Hospital, Hampstead, during 1916-17. He was appointed a member of the Chemical Warfare Committee and a member of the Inter-Allied Chemical Warfare Conference and was twice mentioned in dispatches and promoted to the rank of lieutenant-colonel. Upon his return to Montreal in 1918 he was made medical consultant, C.A.M.C. and resumed his duties at McGill and the Royal Victoria Hospital.

He became associate dean of medicine at McGill in 1940, and became dean in May, 1941. He is a native of Hamilton, Ont., and was educated at Hamilton Collegiate and later at McGill University where he received his M.B., C.M. degree.

From 1904 to 1906 he was resident physician at the Royal Victoria Hospital. For four years thereafter he was assistant in medicine at Johns Hopkins Hospital, Baltimore, from 1907 to 1910, returning to the Royal Victoria Hospital that year as assistant physician. He has served as president of the Canadian Medical Association and of the American College of Physicians.

Du 5 au 10 octobre prochain aura lieu, pour la cinquième année consécutive, le cours de perfectionnement du professeur agrégé Paul Letondal sur la pathologie digestive du nourrisson. Les médecins suivants collaboreront à ce cours: Pr. Georges Baril, Pr. agrégé Philippe Panneton, les Drs Daniel Longpré, Albert Guilbeault, J. H. Charbonneau, Albert Jutras, Paul Caumartin et J. P. Bombardier. Les leçons auront lieu l'après-midi à l'hôpital Général de Verdun, 4000 Bd. Lasalle, Verdun, dans la salle du bureau médical. Pendant cette semaine, tous les matins de 9 heures à midi, dans les hôpitaux, il y aura conférences de séméiologie et de thérapeutique digestive avec présentation de malades. On s'inscrit à 418 rue Sherbrooke Est, Montréal. Le droit à verser est de \$3.

Avec la fin de septembre, les possibilités d'épidémie de poliomyélite dans la province de Québec sent minimes. Il faut féliciter les comités qui ont vulgarisé les mesures prophylactiques et les divers organismes qui ont renseigné le public sur la question.

JEAN SAUCIER

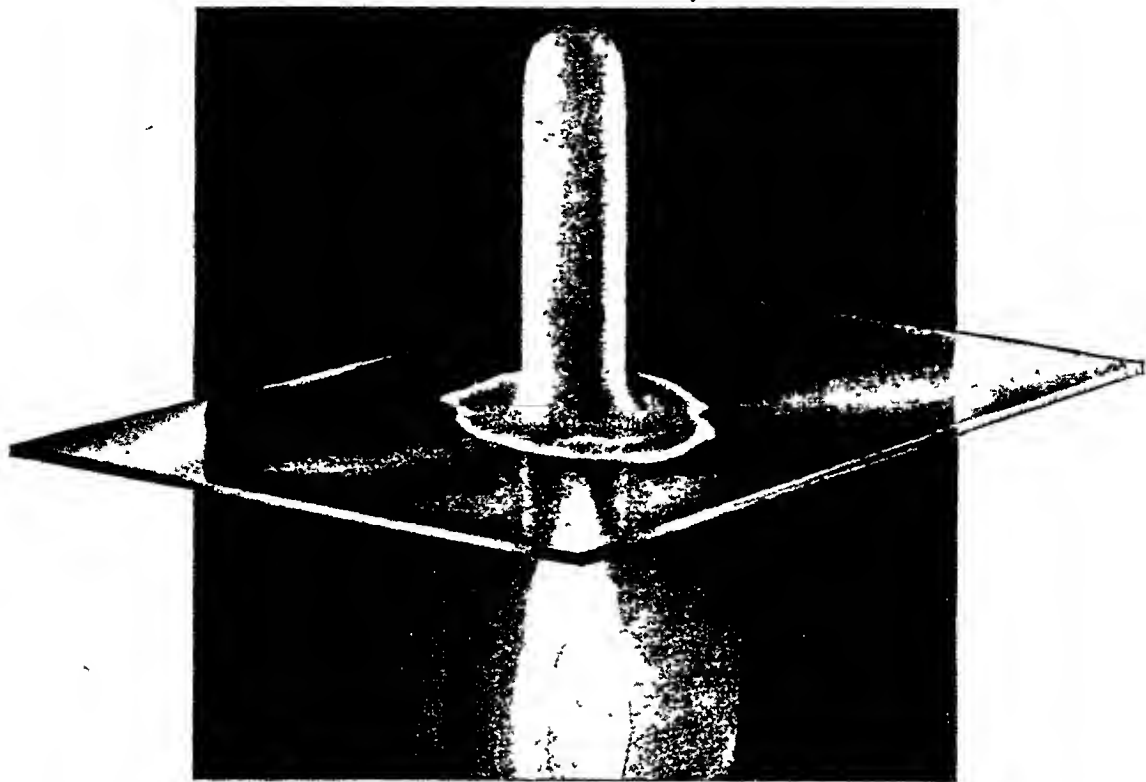
General

The Meyers Memorial.—The Canadian Medical Association receives the sum of \$100.00 a year from the estate of the late Dr. Campbell D. Meyers to provide an honorarium known as The Meyers Memorial.

The award is made in accordance with the instructions of the donor, which are:

1. That the award shall be made "... to such member or guest of the Canadian or of one of the Provincial Medical Associations as shall write and read at the annual meeting of any of the said Associations the best thesis or dissertation. . . ."

2. That the subject shall be "... the study and treatment of those functional neuroses which, if untreated, or not treated sufficiently early might probably terminate in insanity. . . ."



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"... it is impossible to classify definitely the type of diseases referred to above. I desire however to refer to those Functional Neuroses in which the psychological symptoms form the essential part of the syndrome, and to that type of Neurosis which develops in late adolescent or in adult life in a patient of previous good mental and nervous history, especially such neurosis as has its etiology in emotional overstrain caused by excessive grief, worry and allied conditions. . . ." "I desire to exclude from this thesis the study of Mental Defectives, Paranoia and similar conditions of mental disease duo to hereditary or organic states. . . ."

3. That the award shall be made "... by a Committee consisting of the President, a physician and a neurologist. . . ."

Those who wish to submit a thesis are advised to confer, in advance with the Chairman of the Meyers Memorial Committee in order to make sure that their thesis will come within the terms of the award.

The thesis must be in the hands of the Chairman of the Meyers Memorial Committee on or before May 31st if it is to be considered for the award of that year and should be forwarded to him at 184 College Street, Toronto. Any thesis received after May 31st will be considered as being submitted for the following year.

Medical Library Association.—The Medical Library Association held its 44th annual meeting in New Orleans, La., May 7 to 9th, 1942. Officers elected for the coming year are: Mary Louise Marshall (Tulane University), President; Dr. John F. Fulton (Yale University), Vice-president; Frida Pliefke (Mayo Clinic), Secretary; and Bertha B. Hallam (University of Oregon), Treasurer. The program featured a Symposium on Tropical Medicine, Medicine in the South, and the Medical Library in the War Program. Selection of the place for the 1943 meeting has not yet been made.

American Board of Obstetrics and Gynecology Examinations.—The next written examination and review of case histories (Part I) for all candidates will be held in various cities of the United States and Canada on Saturday, February 13, 1943, at 2.00 p.m. Candidates who successfully complete the Part I examination proceed automatically to the Part II examination held later in the year. All applications must be in the office of the Secretary by November 16, 1942.

For further information and application blanks, address Dr. Paul Titus, Secretary, 1015 Highland Building, Pittsburgh (6), Pennsylvania.

Book Reviews

Principles of Anatomy as Seen in the Hand. F. W. Jones. 2nd ed., 417 pp., illust. \$7.50. Macmillan, Toronto, 1942.

On this side of the Atlantic human anatomy is far too frequently taught by those who have no medical training or experience of clinical work. The subject therefore tends to become a dry and academic one, detached from current medical problems and questions, and its importance as the essential foundation of all medicine, for the mechanic must know his machine, is often forgotten. Consequently the study of anatomy is very generally regarded as a barely necessary, tiresome, and rather fruitless discipline.

This book should be a wholesome corrective to so negative an attitude. It is not, as so many books on anatomy are, a bare list of the spatial relationships of certain fixed and determined structures but a study of the human hand as a living, changing, responsive organ adapted to perform many important tasks, and owing its present form and proportions to a long process of evolution. Form is intimately related to function and can sometimes in the individual modify itself with startling rapidity to meet a change of function. But the author goes further and seems to accept a Lamarckian view of evolution, that is, he apparently believes that a change of function can in time beget an hereditary change of form. The geneticists would certainly challenge this doctrine with all the vehemence they can command, but possibly many general biologists better acquainted with Nature in the wild than in the laboratory and not yet convinced that the science of genetics has gleaned the whole truth of heredity and variation would be more sympathetic. However this may be, the author has made clear how barren and meaningless a knowledge of structure can be without a corresponding knowledge of function and what disastrous results may ensue when injuries of the hand are treated by those whose knowledge in either department is inadequate. The preface points to the coincidence that this second edition of the book, like the first, appears during a world war when the call to treat so many cases of war injury may once again awaken the medical profession to the need for a thorough knowledge of both anatomy and physiology.

The book can be recommended to all who have any interest in Medicine or general biology. It opens so many interesting questions and suggests so many further ones that few will not be entertained and instructed by the perusal. It is especially a good tonic for those who think that anatomy is a barren and uninteresting topic, which medical practitioners can afford to neglect without gravely impairing their professional ability.

Urological Diseases of Pregnancy. E. G. Crabtree. 472 pp., illust. \$6.50. Little, Brown & Co., Boston, 1942.

This work is a very commendable effort to collect from the literature all the known facts on the urology of pregnancy. The first comprehensive study in this subject, it is the result of more than twenty years of intense study in a field in which the author has pioneered. The results of his undertaking exemplify the value of the close co-operation of various types of specialists working in a common field.

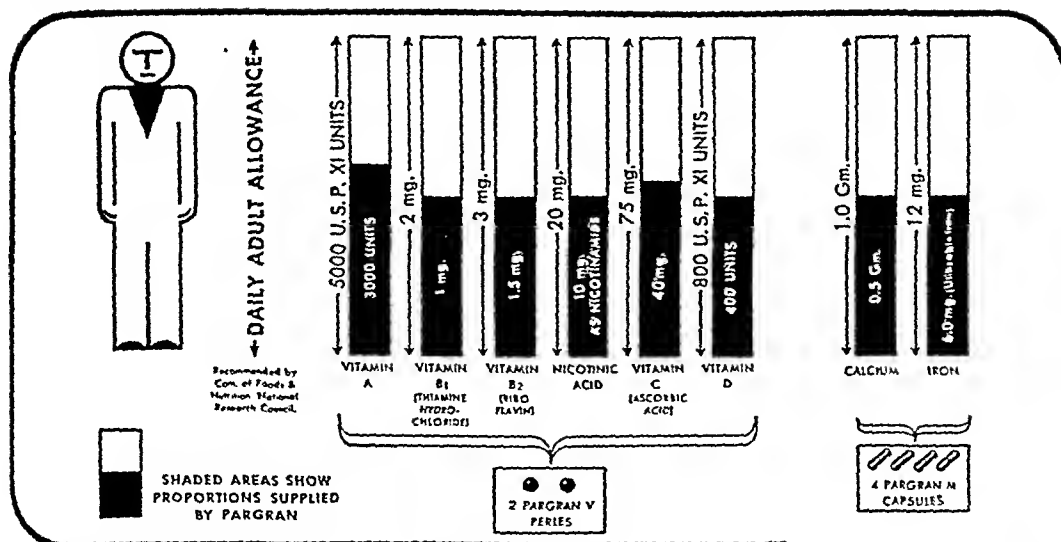
No fact seems to have been omitted which has a urological relation to pregnancy. The subject is presented in an able and scholarly fashion, and is supported in the text by full bibliographical references.

The book makes interesting reading, not merely for obstetricians and urologists, but also for clinicians, to all of whom it makes available in a convenient form advances in many fields and directions, in so far as they relate to the care and treatment of the pregnant woman.

Anatomy of the Human Body. H. Gray. Edited by W. H. Lewis. 24th ed., 1428 pp., illust. \$13.75. Macmillan, Toronto, 1942.

There is an old saying that "Good wine needs no bush". "Gray" needs no extended commendation. The Anatomy appeared first in 1858, and the fact that it has gone through so many editions and still remains a prime favourite is sufficient proof of its excellence.

The present volume, edited by Dr. Lewis, of Philadelphia, assisted by six distinguished anatomists, has been thoroughly revised and enlarged by the introduction of new matter, bringing the subject up to date. Yet the general plan of the work has been retained. Im-



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proved and some new illustrations have been introduced, which give the book an additionally attractive appearance. The additions and alterations have resulted in the expansion of the work by 47 pages.

In the preface the editor states "It is impossible in a book of this size and complexity to avoid typographical and other errors. Both the publisher and editor are grateful to those who have in the past pointed them out, and we hope that they and others will continue to do so in the future." We point out one more, which in our judgment is somewhat lamentable. The word "pubis" is consistently used, both in the text and index, and even in the plates themselves where "pubes" should have been used. "Pubes" is the nominative case; "pubis" is the genitive. The term "symphysis pubis" is used correctly, but "pubis" is generally used incorrectly for "pubes". It is a pity that in a work of such distinction as Gray's Anatomy currency should be given to a common and gross error in latinity.

Surgical Physiology. J. Nash. 496 pp. \$6.00. C. C. Thomas, Springfield, 1942.

Physiology is one leg of the tripod which supports the knowledge of surgery. A most excellent up-to-date review of all that pertains to physiology in its relationship to surgery is contained between the covers of Dr. Nash's book. Obviously the volume is written by a well trained surgeon, who has realized that his book will have its greatest appeal to practising surgeons and students of surgery. In other words, it will be appreciated by those who have little time to read original articles in physiology, and, what is more important still, most of the readers lack training in physiology sufficient to evaluate them.

The book is divided into seven sections: Circulatory System, Respiratory System, Alimentary System, Body Fluids, Endocrine Glands, Cerebrospinal Nervous System, and Autonomic Nervous System. All are thoroughly and ably discussed. To mention a few which have wide appeal, are the newer ideas on the physiology of burns, shock, spinal anesthesia and "mis-referred" pain as the author prefers to call it.

It is difficult to find anything to criticize adversely. However, Canadians at least would like to find some reference to heparin. One would like to have had Dr. Nash discuss cardiopasm in a little more detail as well as hematemesis, whether or not and when transfusion is advisable in the acute stage. No reference to serum acid phosphatase in connection with carcinoma of the prostate was found. These omissions are for the most part trivial and do not detract greatly from the value of the book. Anyone who examines Dr. Nash's book will wish a copy, for it is easily the best of its kind this reviewer has ever seen.

Chemistry and Physiology of the Vitamins. H. R. Rosenberg. 674 pp. \$12.00. Interscience Publishers, New York, 1942.

The emphasis in this book is on the chemistry of the vitamins. It is obvious that the author has first hand and extensive knowledge of the subject. The physiology is stated so far as that is possible but it is evident that the author's interest is in chemistry. Synthesis of vitamins in the laboratory is the principal subject of the book. The first sections are devoted to a discussion of the vitamins in general; history, nomenclature, occurrence, chemistry, physiology and pathology. After that each vitamin is considered separately under a group of headings, such as occurrence, properties, isolation, chemical constitution, synthesis, industrial methods of preparation, biogenesis, physiology, deficiency. The uniformity of treatment makes for ease of reference. The chemist will find undoubtedly a great deal that is of value to him. So far as physiology is concerned there does not seem to be anything with which one is not

familiar. For the practitioner of medicine who desires a knowledge of vitamins that will enable him to use them intelligently the information is here, but he can obtain it as easily and more cheaply from other sources.

Leukæmia in Animals. J. Engelbreth-Holm. 245 pp. 15/-. Oliver & Boyd, Edinburgh, 1942.

This volume was written on the invitation of the Scientific Advisory Committee of the Lady Tata Memorial Trust. This Trust, as our readers may recall, has as one of its main objects, the encouragement of research on the blood, especially leukemia. Dr. Engelbreth-Holm's volume is one of the most important of these contributions. After a brief historical survey and a discussion on classification and nomenclature the author discusses spontaneous leukemia in birds and mammals. He then considers the experimental transmission of leukemia, especially in birds and mice, the rôle played by heredity, and the attempts to produce the disease experimentally. The book concludes with a brief survey of the nature of the animal leukemias, an extensive bibliography and an adequate index. There are 44 figures, mostly half-tone microphotographs. The manuscript, which was originally written in Danish, has been well translated into English.

The object of this volume is the better understanding of human leukemia and the gathering together, at an appropriate time, the numerous scattered studies on the disease in animals. It is a true study in comparative medicine in the Oslerian meaning and as such, is an invaluable contribution to a most important aspect of cancer research.

Illustrations of Bandaging and First Aid. L. Oakes. 2nd ed., 256 pp., illust. \$1.75. Macmillan, Toronto, 1942.

This is one of the evidences of the greatly increased interest in first-aid methods. It fulfills its function admirably as a very clear and comprehensive guide to an art which is now left almost entirely to First Aid workers. But medical men have something to learn from it.

Memorable Days in Medicine. P. F. Clark and A. S. Clark. 305 pp. University of Wisconsin Press, Madison, 1942.

This small book is described as "A Calendar of Biology and Medicine". It gives for every day of the year a short biographical sketch of some notability in these pursuits, or a description of some peculiar custom, taking as nearly as is possible the birthday of the person mentioned. Naturally, the selection depends on the personal opinions of the authors, but it may be said that few will dissent from their judgment. Reference is made easy by the presentation of a short list of books relating to the History of Medicine, and this is followed by a list of the names mentioned in the text, of course, arranged alphabetically. The book will have a special interest for students of the history of medicine and will also be helpful to those editing medical articles and journals. A useful piece of work!

Disability Evaluation. E. D. McBride. 3rd ed., 631 pp., illust. \$10.00. Lippincott, Montreal, 1942.

This valuable reference work was published first in 1936. The important addition now has been the composite schedule of disability evaluations which as the author states, gives "a reasonably definite standard of average ratings" for reference.

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after the completion of treatment. An analysis of how to scientifically examine for and measure disability in the various anatomical structures is given. Fractures are considered in considerable detail, together with principles underlying the prevention of disability after fractures. Sections on the Industrial Back, Nerve Injuries, Amputations, Head Injuries, The Eye, Ear, Chest, Burns and Hernia are well treated.

This is a most valuable reference and one of the contents of which should be well known to surgeons dealing with traumatology, especially in the industrial sphere.

The Medical Applications of the Short Wave Current.

W. Bierman. 2nd ed., 344 pp., illust. \$5.00. University of Toronto Press, 1942.

This book is the most complete work available on the short wave current. It is a monograph covering the whole subject from both the physical and the clinical viewpoints. The greater portion of it is devoted to the clinical applications of short waves, making it invaluable to any users of these. The author presents the experiences of his clinic and those of other workers in the subject. Comments on the claims of other workers both critical and laudatory are a valuable feature in placing such claims in their proper perspective. This second edition contains an additional chapter on fever therapy outlining the author's somewhat unique technique in this procedure. Towards the end of the book there are a few minor typographical errors of which the most obvious is "metal" for "material" on page 119. The book is well written and should be a useful reference book to anyone doing physical medicine.

Diseases of Metabolism. Edited by G. G. Duncan.

985 pp., illust. \$14.00. MacAinslie, Toronto, 1942.

This book has been compiled for the general practitioner who today requires a more detailed source of information on diseases of metabolism than is found in most textbooks on medicine. The work is edited by Garfield W. Duncan and consists of contributions by fifteen authorities. The Foreword of the book is by the late Sir Frederick Banting and it is of interest to quote part of his statement. . . . "To present to the physician, the teacher and the student of medicine the true picture, as it is today, of the diseases of metabolism is a great responsibility. The editor has wisely chosen a group of outstanding authorities to assist him in this task. It is hoped that this book will fill the need for ready information on a subject which is so important in all fields of medical science". Sir Frederick did not live to see this work completed but the hope which he expressed has been well fulfilled.

Throughout the various sections of the book one is impressed with the fact that the authors have dealt with the subject from the standpoint of the general practitioner. They have avoided a great deal of controversial material that at the present time has little practical application in treatment and which is confusing rather than helpful in the understanding of the underlying principles in metabolism. The field is well covered and the book is recommended to both student and practitioner.

Ornithologists of the United States Army Medical

Corps. E. E. Hume. 583 pp., illust. \$5.00. Johns Hopkins Press, Baltimore, 1942.

This book consists of a series of 36 biographies of members of the United States Army Medical Corps

who made substantial contributions to the science of ornithology. It is surprising to note how many of these men made names for themselves in three different fields. They became famous as medical men in their chosen profession, some reaching the position of Surgeon General of the United States, such as Drs. Hammond and Sternberg. Dr. Casey Wood became professor of ophthalmology in the Chicago Post Graduate Medical School and head of the ophthalmological departments in Northwestern University and the University of Illinois. In spite of this he found time to write several comprehensive ornithological works. Others became better known to the public for their ornithological activities, such as the famous Dr. Coues whose textbook on North American Birds was the standard for 50 years. A third group reached outstanding positions in military life. Among these is the Dr. Crawford who was made a Brigadier-General and later a Major-General for his part in the heroic defence of Fort Sumter. Dr. Leonard Wood, a Governor in the Philippines was another who was so successful a soldier that he ran as Republican candidate for the Presidency. The thing for which he is perhaps best remembered is the establishment of the leper colony in Cebu in the Philippines.

From these notes it will be seen that the book is a valuable source of information for doctors, ornithologists, and military men interested in the history of their subject.

Diseases of the Heart. T. Lewis. 3rd ed., 297 pp., illust. \$4.50. Macmillan, Toronto, 1942.

The author has succeeded in his endeavour to discuss the diseases of the heart from the clinician's point of view, and with the simplicity that should make his effort attractive to the student and general practitioner. The opening chapters deal adequately with congestive failure, its early recognition and management. The clinical recognition of normal and abnormal venous pressure and the significance of variation in pressure with posture and congestive failure are stressed and admirably presented. Due emphasis has been placed on a careful clinical history and the knowledge and judgment required to interpret such in conjunction with physical findings. Stress is placed on the necessity for a complete diagnosis. To recognize an irregularity or a murmur is important, but not a diagnosis. If the irregularity or murmur is of organic origin then the recognition of the underlying disturbance in the whole vascular system is essential in order to make a diagnosis. The prognosis in a given case cannot be made from statistical records nor from the type of valve lesion present. It must be based on the capacity of the myocardium to do that which, under the circumstances, is required of it, and its ability to withstand intercurrent infection.

The discussion of the thyrotoxic heart is not of course a treatise on toxic goitre. Management of the circulatory disturbance, after all, is adequate treatment of the causative factor. The diagnostic factors and pre-operative management as outlined are the weakest part of the entire book. Nevertheless, other subjects are so admirably presented that this may fall short only by comparison.

BOOKS RECEIVED

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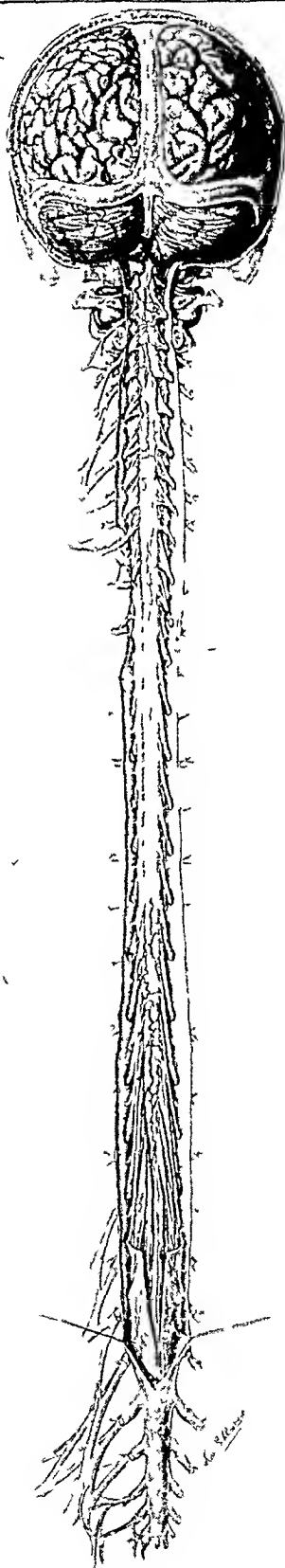
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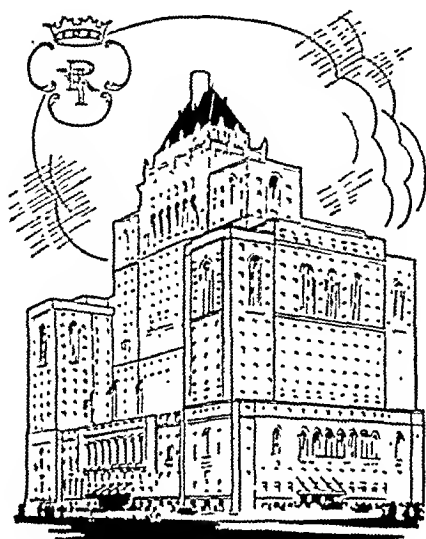
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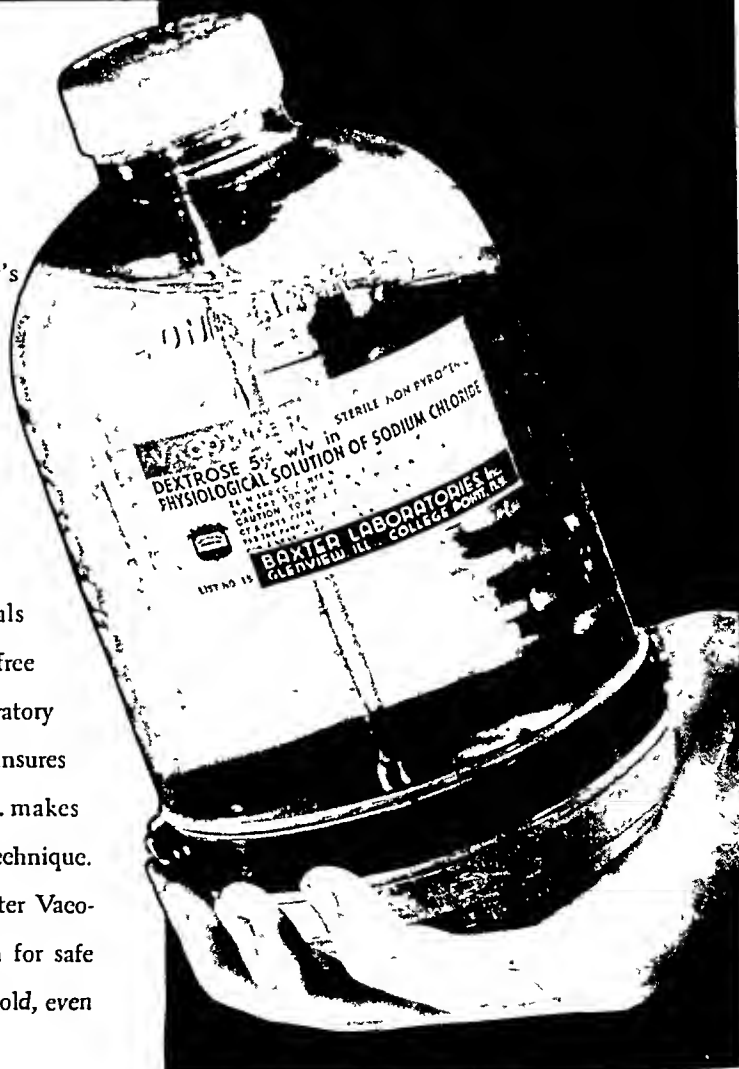
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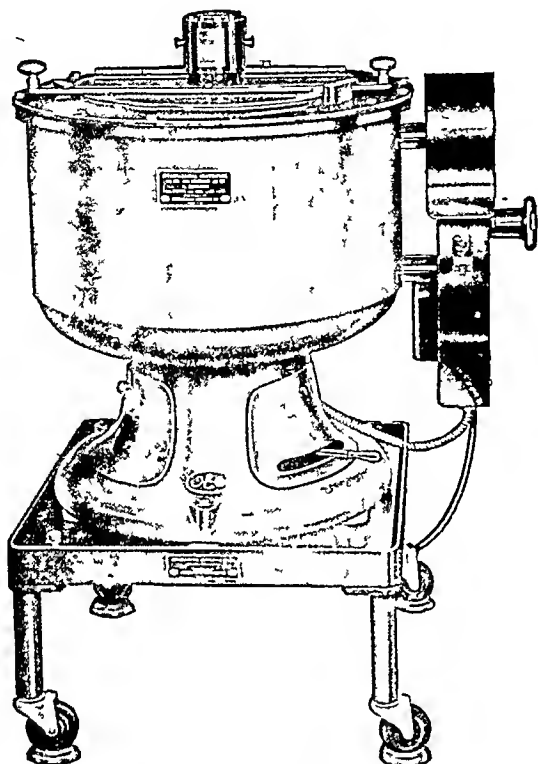


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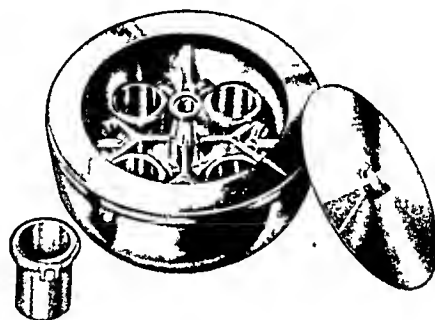
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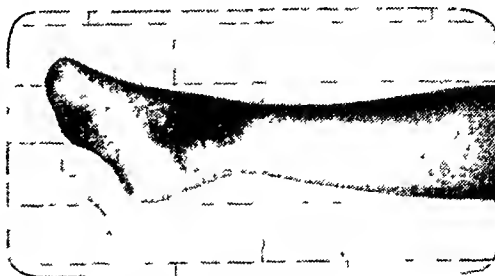
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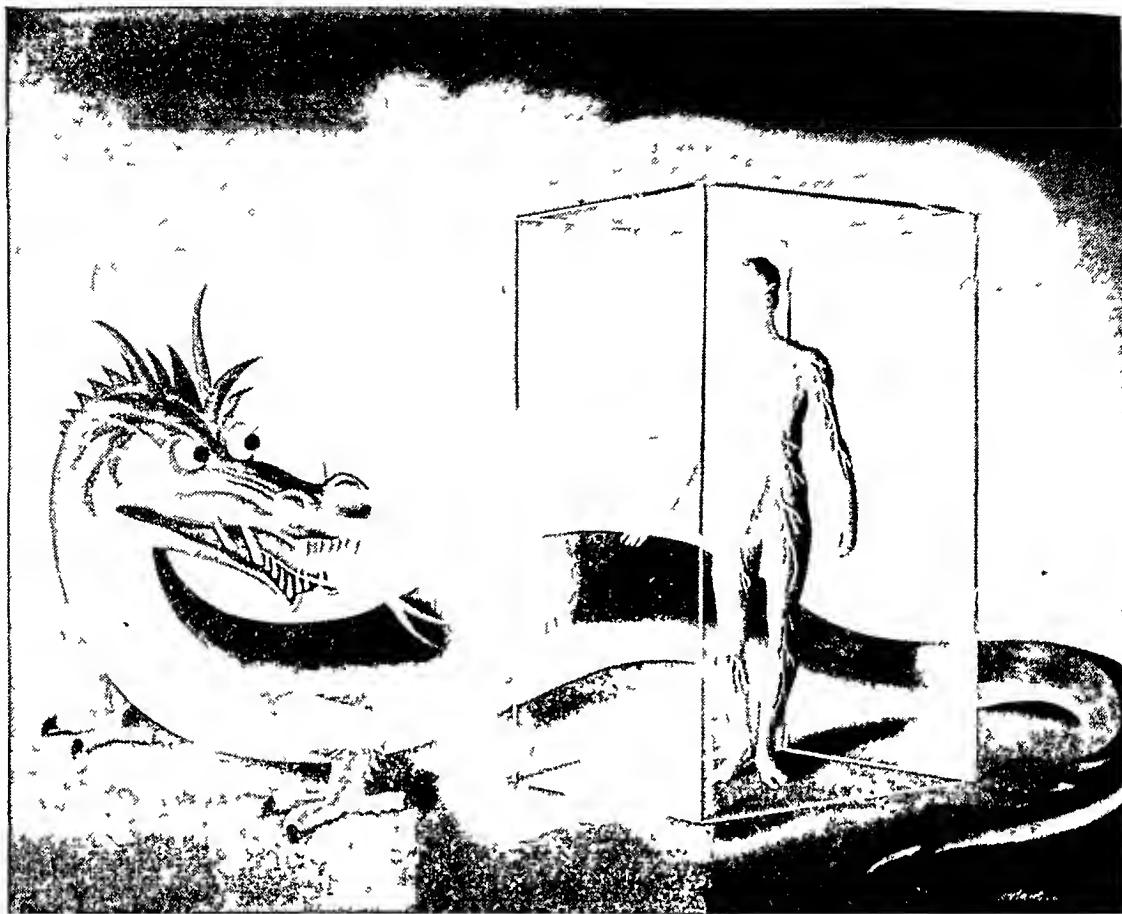
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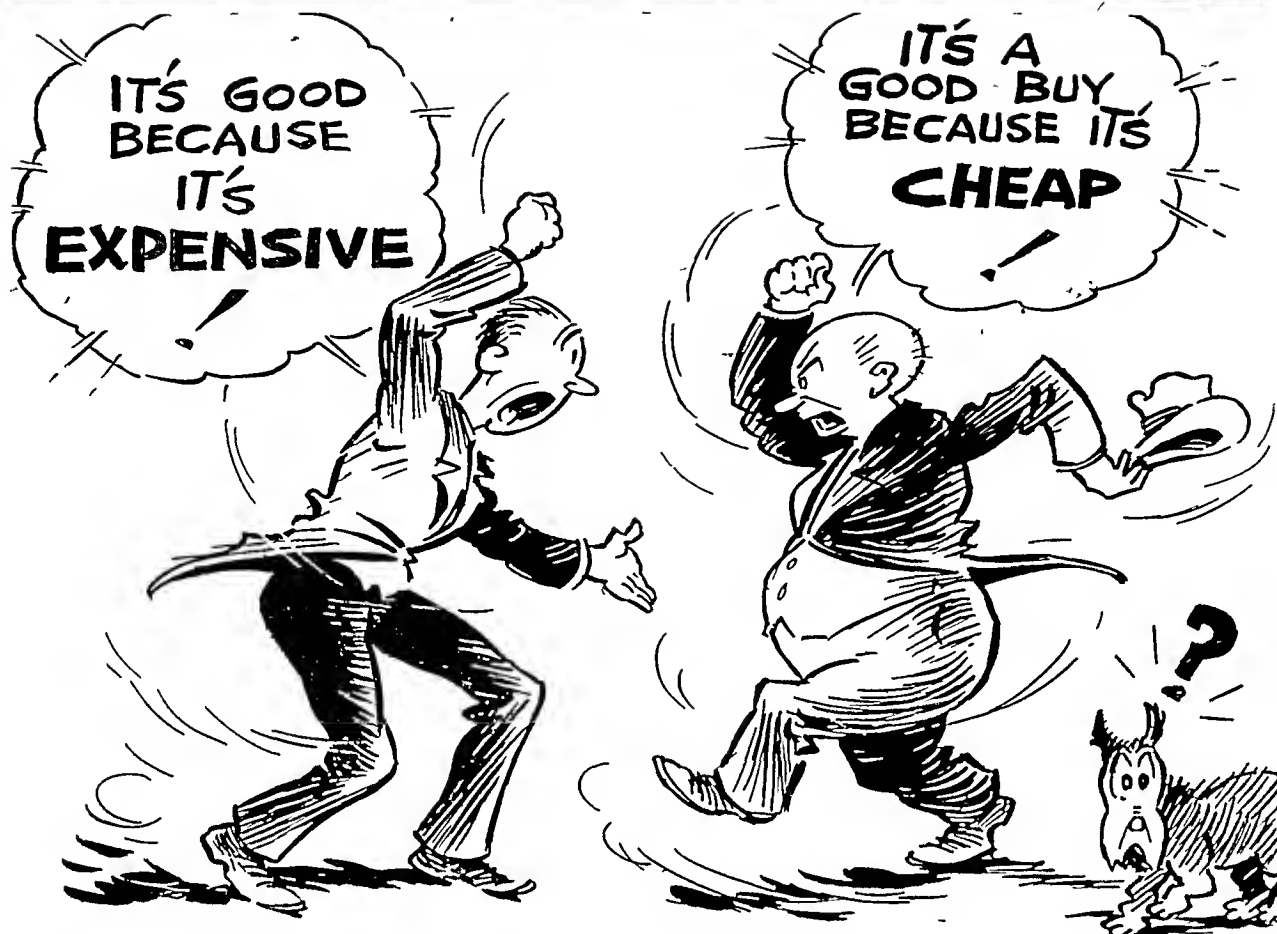
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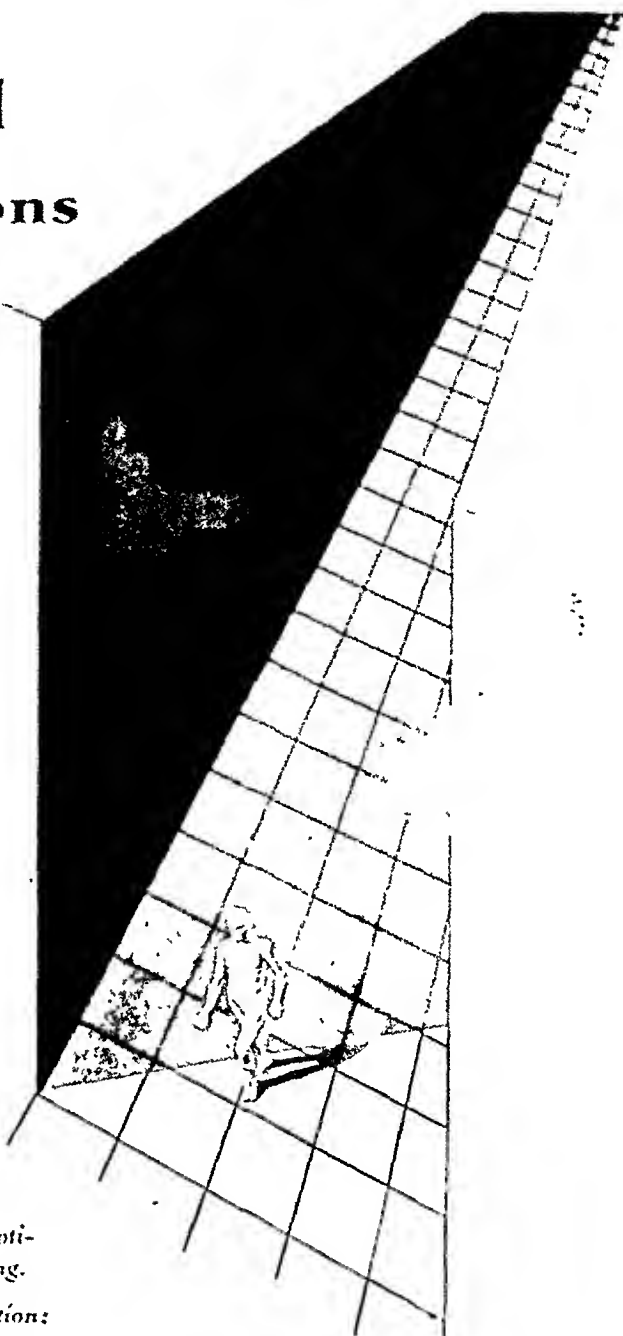
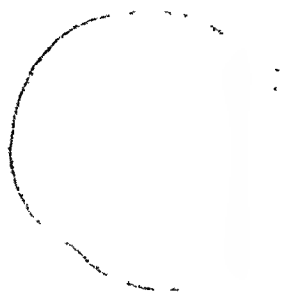
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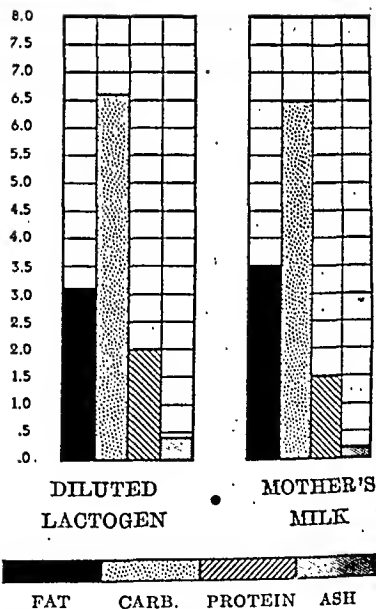
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Clinical Pediatrics, p. 156



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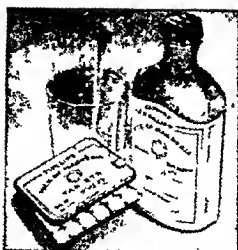
As a laxative, it is gentle and thorough As an
antacid—three times as effective as a saturated
solution of sodium bicarbonate.

PHILLIPS' MILK OF MAGNESIA (Liquid)

As an antacid—2 to 4 teaspoonfuls
As a gentle laxative—4 to 8 teaspoonfuls

PHILLIPS' MILK OF MAGNESIA TABLETS

As an antacid 2 to 4 tablets

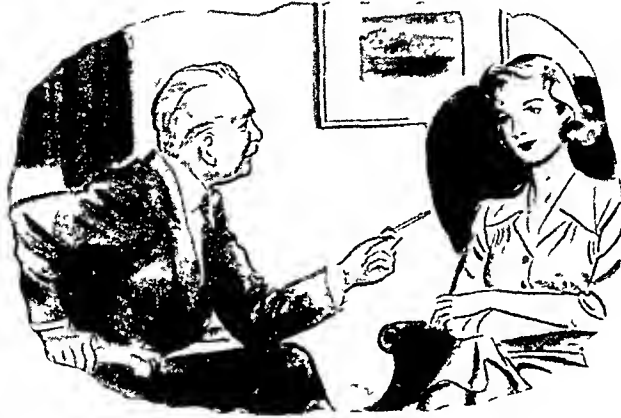


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Q. I've heard that canners just use the surplus crops.
Is that true?

A. No. As a matter of fact, many of the varieties used for canning can not be obtained in any other form. Most canners contract for their crops for canning, months in advance. They usually specify the variety of fruit or vegetables wanted. And in many cases this means furnishing seeds or plants especially developed for their purposes. (1)

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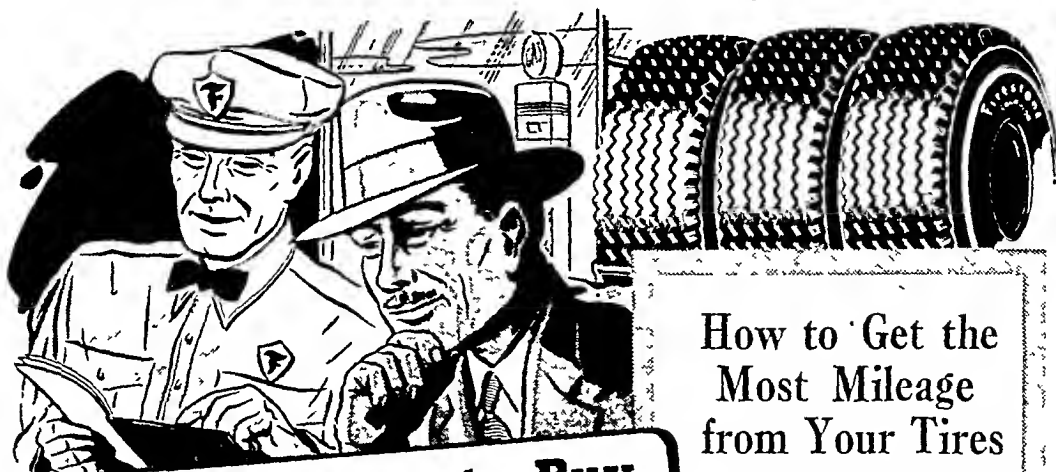
(1) 1939. Agr. Expt. Sta. Univ. Wisconsin, Bul. 444.

1939. Univ. Maryland Agr. Expt. Sta. Bul. 425.

1937. U. S. Dept. Agr. Farmers Bul. 1253.

1937. Univ. Illinois Agr. Expt. Sta. and Extension
Service in Agr. and Home Econ. Circular 472.

1929. Univ. Maryland Agr. Expt. Sta. Bul. 318.



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Under Wartime Regulations**

To save time, first go to your nearest Firestone Dealer who has complete official tire information. He will advise and help you fill out the Application for a Ration Permit, furnish the Dealer's Inspection Report, and do everything he can to assist you.

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**How to Get the
Most Mileage
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1. Have air pressure checked every week. *Underinflation is the greatest enemy of tire life.*
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3. Park with care — do not scrape sidewalls or bump the curb.
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5. Have tires *completely* inspected every 5,000 miles and rotated at the same time.

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DEALER CAN HELP
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1. Completely inspecting tires and tubes at frequent intervals for cuts and bruises.
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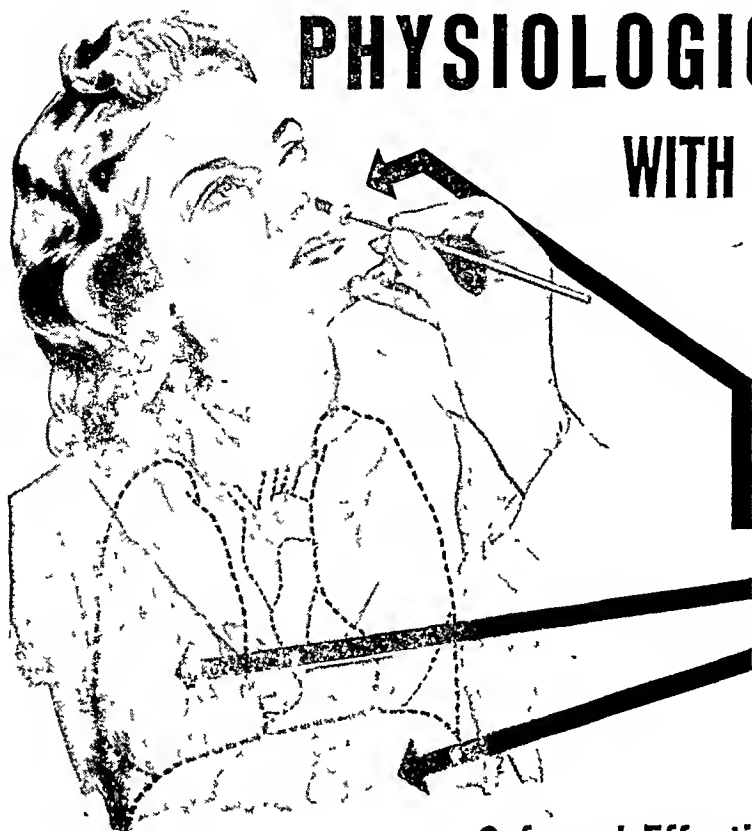
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NO PULMONARY COMPLICATIONS

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Safe and Effective Mucous Membrane Therapy.

The ability to kill micro-organisms is but one of many factors which determine the clinical efficacy of a mucous membrane antiseptic.

It is because ARGYROL impedes bacterial life without injuring the tissues; because it aids and does not impede those natural defensive processes which the tissues employ to throw off infection, and because it is non-noxious to the organism as a whole, that ARGYROL is truly a "physiologic mucous membrane antiseptic."

ARGYROL effects a decongestion through circulatory stimulation and without resorting to powerful artificial vasoconstriction. Because of its unique

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- DECONGESTION WITHOUT VASOCONSTRICTION

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BECAUSE the G-E Model F-3 Office-Portable X-Ray Unit seems so small in size, and its price is moderate, don't overlook its practical diagnostic range and its ability to produce radiographs of high quality.

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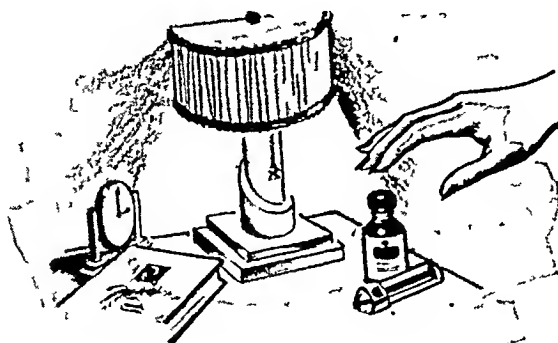
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swift, prolonged decongestion of engorged nasal tissue with relative freedom from unpleasant side reactions prescribe

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Hydrochloride

(laevo—alpha—hydroxy—beta—methyl—amino—3 hydroxy ethylbenzene hydrochloride)



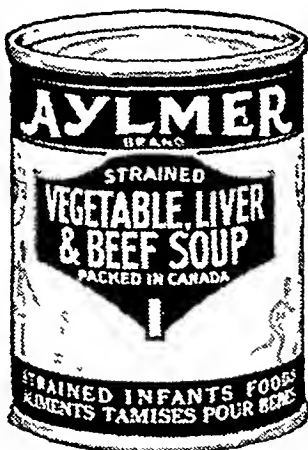
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The Nasalator — a calibrated, transparent plastic applicator; easy to fill, leak-proof, convenient to carry and use.

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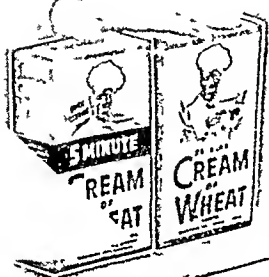
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5-Minute "CREAM OF WHEAT"

Each ounce contains in average
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Phosphorus.....168 mg.
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Actually contains more of these min-
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Cooks to full digestibility—even
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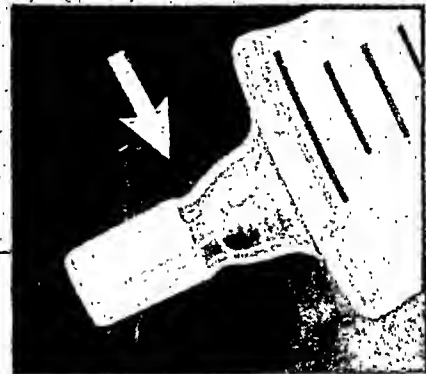
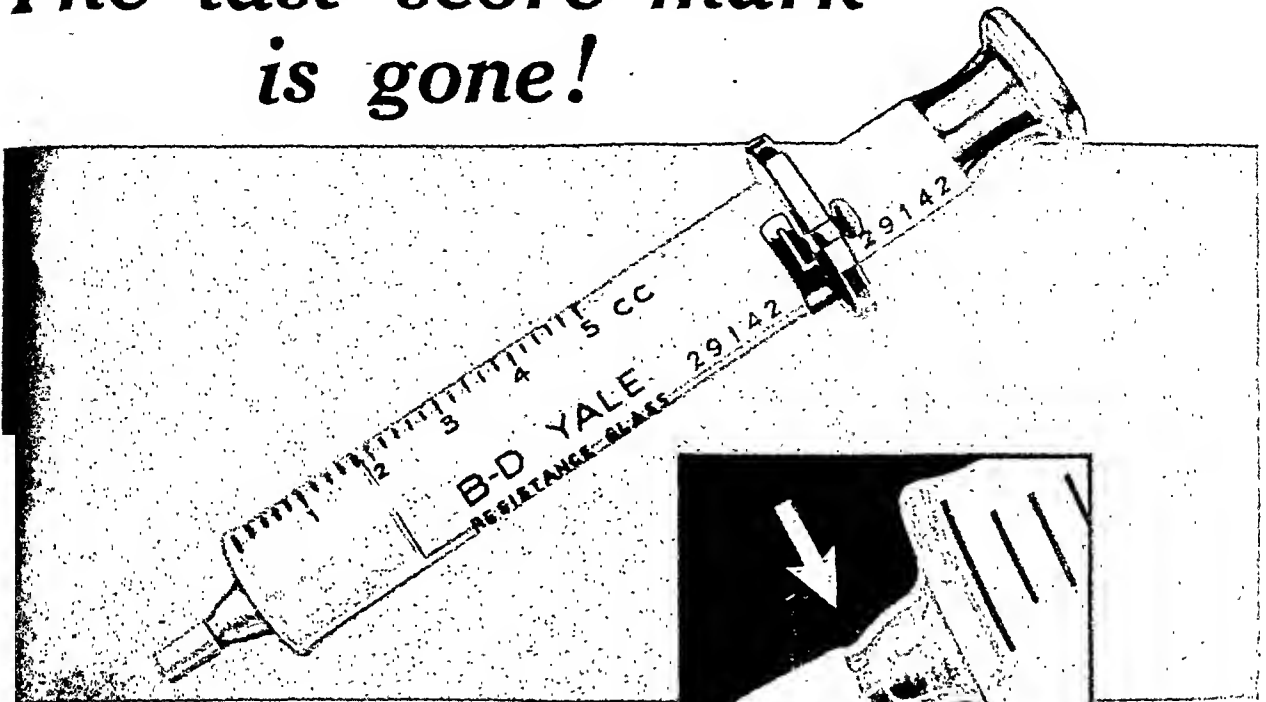
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During the next few months, there will be an increase in affections of the Respiratory Tract.

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Many clinicians have recognized the value of externally applied moist heat in relieving the troublesome symptoms so often present in these conditions.

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PRESIDENT - JOHN F. ARGUE, M.D.

A mutual medical defence union founded in 1901, Incorporated by act of Dominion Parliament, February, 1913, and affiliated with the Canadian Medical Association, 1924.

OBJECTS: To assist in the defence of its members in cases of alleged malpractice, and to encourage honourable practice in the daily work of the medical profession.

Subject to our by-laws, assistance is given by the payment of the taxable costs of actions together with reasonable counsel and witness fees in cases undertaken by our Association, as well as damages if awarded. All members in good standing of the Canadian and various Provincial Medical Associations may be enrolled upon signing the application form and paying the annual fee. All other regularly qualified practitioners must have their application counter-signed by two members of our Association.

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qualified practitioner of the Regular School of Medicine hereby apply to be enrolled as a member of the Canadian Medical Protective Association.

I am a graduate of _____ University
in the year _____, and a duly licensed practitioner
of the Province of _____. I am also
a member in good standing of _____
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Address _____

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The annual fee is five dollars per calendar year, half
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... **But**, it does provide a safe degree of vasoconstriction, and a soothing palliation of the acute discomfort;

... **And**, its protective film helps to forestall bacterial invasion of the distressed mucous membrane, and the development of serious complications.

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FORMULA: 'Pineoleum' incorporates camphor (.50%), menthol (.50%), eucalyptus oil (.56%), pine needle oil (1.00%) and oil of cassis (.07%) in a base of double distilled liquid petroleum—100% or with ephedrine (.50%)



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Many ingenious methods of investigating the anatomic, functional and bacteriologic status of the kidneys, ureter and bladder are used.

Ranking high in value among urologic diagnostic procedures is excretion urography. This method effectually supplements retrograde pyelography and often yields information which is obtainable in no other way.

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'DETTOL' Antiseptic can be used at really effective strengths without danger or discomfort. It is stable in the presence of blood, faeces and other organic matter. A 2% solution rapidly kills haemolytic streptococci and B. Coli even in the presence of pus.

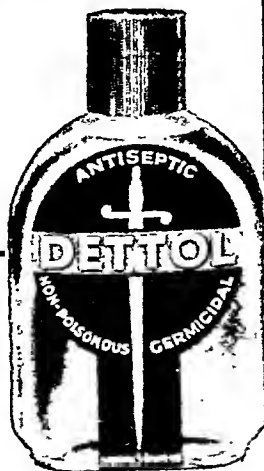
When a thin film of 30% 'DETTOL' dries on the skin, it renders it insusceptible to infection by haemolytic streptococci for at least two hours, unless grossly contaminated.

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ALL These Qualities:—**

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This Important Paper, by Bernard Fantus, M.D., and Geza Kopstein, M.D., reports an extensive search of the world's medical literature to ascertain whether the records disclose any foundation for an assumption that there is a relationship between bran and intestinal obstruction. The conclusions of the authors, based on 75 cases analyzed, are given below:

"1 In a review of the world's literature on bran impaction in the bowel, only four actual cases of this kind could be discovered. In three of these the impaction was preceded by gross intestinal pathology. The fourth case (Davis) is not sufficiently well described to permit of analysis as to its nature; but predisposing cause was probably present.

"2 Bran is obviously not likely to produce intestinal obstruction unless an organic predisposing cause is present.

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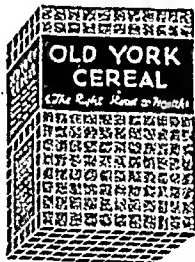
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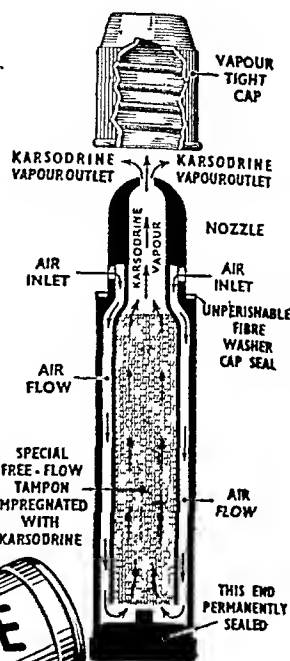
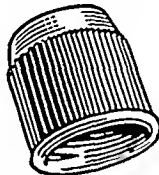
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CACTINA PILLETS

... a preparation of Cactus Grandiflorus is indicated for symptomatic relief of irregular pulse, feebleness of the heart's action, dyspnoea, weight or oppression in the chest

as induced by excessive use of tobacco and stimulants; arrhythmias produced by fatigue, emotion or indigestion.

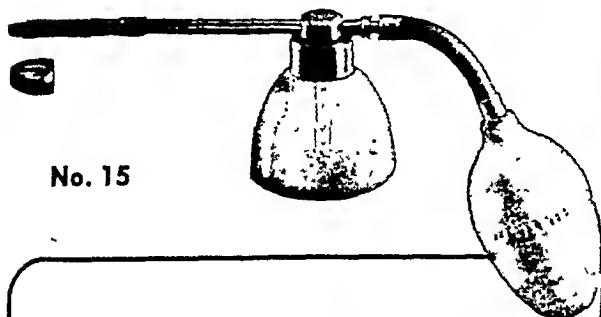
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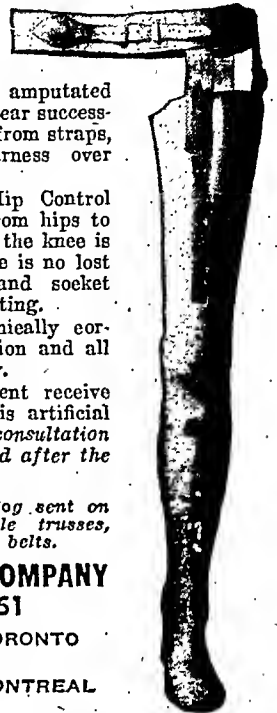


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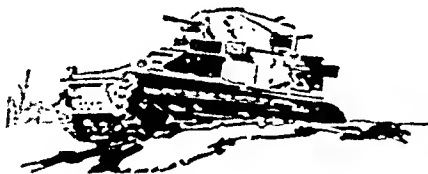
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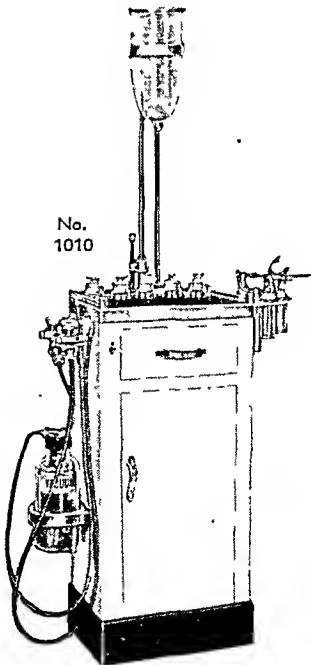
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Total solids	5.87 gm.
Ethyl alcohol (7.9% by volume)	6.25 gm.
Total carbohydrates	3.86 gm.
Reducing sugars as glucose	0.66 gm.
Protein	None
Total nitrogen	0.10 gm.
Ash	0.28 gm.
Phosphorus	38.50 mg.
Calcium	7.00 mg.
Iron	0.072 mg.
Copper	0.049 mg.
Fuel value	61 cal.
Vitamin B ₁	6 Int. Units
Vitamin G	33 Sherman Bourquin Units



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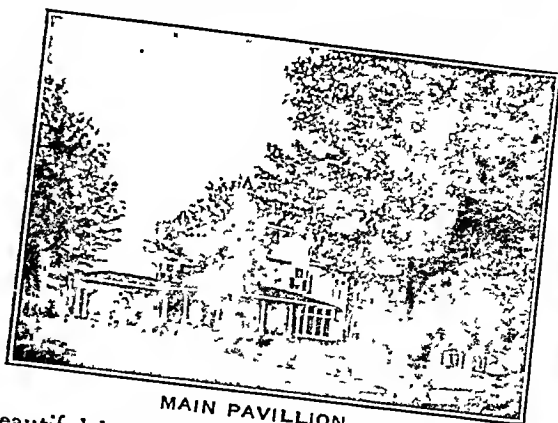
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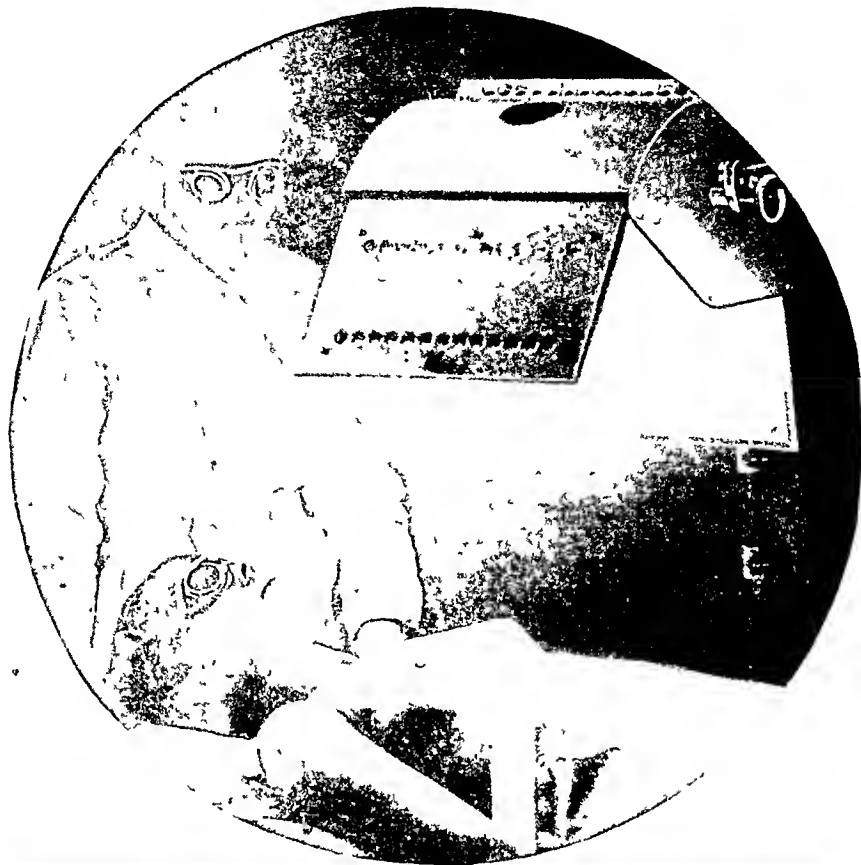
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1. Whitby, L. E. H. and Britton, C : *Disorders of the Blood*, Churchill, 1935, p. 191.
2. Musser, J. H. and Wintrobe, M. M. Tice, *Practice of Medicine*, Prior, Vol VI, p. 852.

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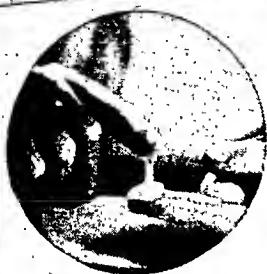
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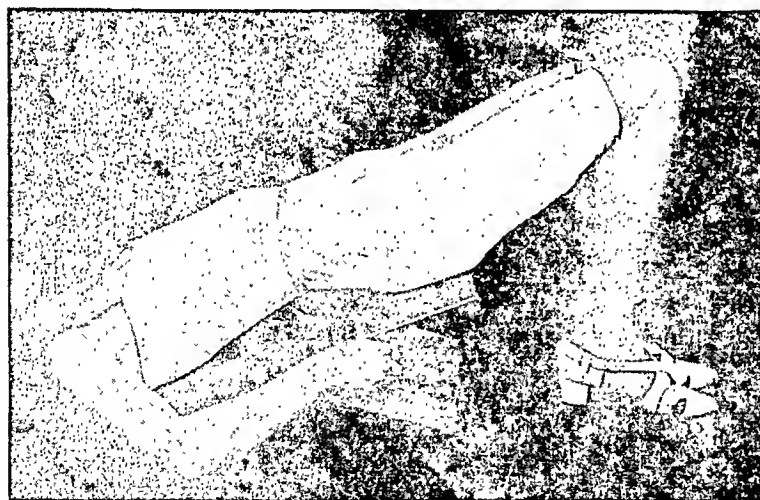
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